SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1890.

No. 345.

THE ACME HAY HARVESTER COMPANY, APPELLANT,

vs.

STEPHEN MARTIN, THOMAS MARTIN, CHARLES O. SMALLEY, JOSEPH B. DUNCAN, AND CHARLES O. PETERS.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF ILLINOIS.

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JUDD & DETWEILER, PRINTERS, WASHINGTON, D. C., OCTOBER 16, 1890.

1 Pleas in the circuit court of the United States of America for the northern district of Illinois, held at the United States court-rooms, in the city of Chicago, in the district aforesaid, before the Hon. Henry W. Blodgett, district judge of the United States for the northern district of Illinois, on Monday, the ninth day of January, 1888, in the December term of said court, in the year of our Lord one thousand eight hundred and eighty-seven, and of our Independence the one hundred and twelfth year.

WM. H. BRADLEY, *Clerk.*

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.* } In Chancery.

NORTHERN DISTRICT OF ILLINOIS, *ss:*

Be it remembered that on the eleventh day of November, 1885, came the complainant, by its solicitors, and filed in the office of the clerk of the circuit court of the United States for the northern district of Illinois, at Chicago, in said district, its bond for costs and bill of complaint in said above-entitled cause; which said bond and bill are respectively in the words and figures following, to wit:

2 *Bond for Costs.*

UNITED STATES OF AMERICA,
Northern District of Illinois, } *ss:*

Circuit Court. — Term, A. D. 1885.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.* } In Equity.

I enter myself security for costs in this cause and promise to pay all costs which may accrue to the opposite party in this action or to any of the officers of this court, and in default of payment by the complainant of any costs ordered or adjudged to be paid by it I hereby agree and stipulate that execution may issue against my property for any costs taxed against complainant.

Dated this 7th day of November, A. D. 1885.

JNO. E. KIRK.

Endorsed: Filed Nov. 11, A. D. 1885. Wm. H. Bradley, clerk.

3 Circuit Court of the United States, Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY
vs.
STEVEN MARTIN, THOMAS MARTIN, CHARLES O. Smalley, Joseph B. Duncan, and Charles O. Peters. } In Equity.

Bill of Complaint.

To the honorable the judges of the circuit court of the United States within and for the northern district of Illinois:

The Acme Hay Harvester Company, a corporation duly established and existing under the laws of the State of Illinois and having its principal office at the city of Peoria, in said State, and a citizen of said State, brings this its bill of complaint against Stephen Martin and Thomas Martin, of Chillicothe, in the State of Illinois; Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, residents of the city of Peoria, in the State of Illinois, all citizens of the State of Illinois and at present and at the time of the acts hereinafter complained of copartners in business at the said city of Peoria under the firm name and style of Martin, Smalley & Company.

4 And thereupon your orator complains and says, on information and belief, that Martin H. Kenaga, then of Momence, in the State of Illinois, before and at the time of his application for the hereinafter-mentioned letters patent was a citizen of the United States, and was the true, original, and first inventor of a certain new and useful machine or apparatus, fully described in the specification of the letters patent hereinafter mentioned and named therein an "improvement in horse hay-rakes," and which was not known or used in this country and not patented or described in any printed publication in this or in any foreign country before his invention thereof, and was not in public use or on sale for more than two years prior to his application for letters patent of the United States therefor.

And your orator further shows unto your honors, on information and belief, that on the 2nd day of March, A. D. 1882, said Martin H. Kenaga made proper and lawful application for letters patent of these United States for said invention, whereupon such due and legal proceedings were had that letters patent of these United States, signed, countersigned, and sealed in manner and form as by law required, dated the 13th day of June, A. D. 1882, and numbered 259,550, were granted and delivered to said Martin H. Kenaga for said invention, whereby there was granted and secured to said Martin H. Kenaga, his heirs and assigns, for the term of seventeen years from and after the 13th day of June, A. D. 1882, the exclusive right to make, use, and vend the said invention throughout the United States and the territories thereof—

As will from said letters patent or a duly certified copy thereof,

here in court to be produced, more fully appear, an office
5 copy of the drawing and specification forming part thereof being hereto annexed and made an exhibit to this bill of complaint.

And your orator further shows that the said Martin H. Kenaga, being possessed of the entire right, title, and interest in and to said letters patent throughout the United States and territories thereof, on the 18th day of December, A. D. 1884, by a certain instrument in writing duly executed and delivered by him and bearing date on the day last named, did, for valuable considerations, assign unto one William F. Kenaga, his heirs and legal representatives, all his (the said Martin H. Kenaga's) right, title, and interest in and to the then unexpired portion of the term of the said letters patent No. 259,550, as will more fully appear by said instrument in writing or a duly certified copy thereof, here in court to be produced, and that said instrument in writing was duly recorded in the United States Patent Office on the 9th day of January, A. D. 1885, in Liber S 31, page 386, of Transfers of Patents; that the said William F. Kenaga, on the 28th day of January, A. D. 1885, by a certain instrument in writing duly executed and delivered by him and bearing date on the day last named, did, for valuable considerations, assign unto your orator the entire right, title, and interest in and to the then unexpired portion of the term of the said letters patent No. 259,550 throughout the United States and the territories thereof, as will more fully appear by said instrument in writing or a duly certified copy thereof, here in court to be produced, and that said instrument in writing was recorded in the United States Patent Office on the 23rd day of March, A. D. 1885, in Liber Q 32, page 152, of Transfers of Patents; that the said Martin H. Kenaga and William F. Kenaga, on the
6 28th day of January, A. D. 1885, by an instrument in writing duly executed and delivered by them and bearing date on the day last named, did, for valuable considerations, assign unto your orator all rights of action accrued at that date by reason of infringements of said letters patent No. 259,550 and all damages occasioned by reason of infringements of said letters patent No. 259,550, and did authorize and empower your orator to bring suit in its own name for all damages and profits arising from such infringements, as will more fully appear by said instrument in writing or a duly certified copy thereof, here in court to be produced, and that said instrument in writing was duly recorded in the United States Patent Office on the 23rd day of March, A. D. 1885, in Liber Q 32, page 153, of Transfers of Patents; that by reason of said several assignments your orator became and now is possessed of the entire right, title, and interest in and to said letters patent No. 259,550, and is entitled to all claims for damages or profits that may have accrued by reason of the infringement of said letters patent since the date thereof.

And your orator further shows that the said invention is of great value and utility, and that your orator has made it profitable both to your orator and to the general public by manufacturing and sell-

ing large numbers of horse hay-rakes made in accordance with said invention.

And your orator further shows on information and belief that the said defendants, after the 13th day of June, 1882, and prior to the commencement of this action and during and within the term of seventeen years mentioned in said letters patent, and within those parts of the United States covered by said grant to your orator,
7 to wit, at the said city of Peoria, within said district, and at other places within these United States, with intent to deprive your orator of the profits which it might and otherwise would have derived from the quiet enjoyment of its said rights under said letters patent, and with intent to derive profits from making and using said invention, and without the license of your orator or of the said Martin H. Kenaga or of any person having a right to make an assignment, grant, or license under said letters patent and against the will of your orator, did unlawfully, wrongfully, and injuriously infringe upon said letters patent and your orator's exclusive rights thereunder by making or causing to be made, selling or causing to be sold, and using or causing to be used large numbers of horse hay-rakes which contained and embodied substantially the invention covered by said letters patent, but to what extent said infringement has been practiced by said defendants your orator is ignorant and cannot set forth; but your orator avers on information and belief that the said defendants have made or caused to be made, sold or caused to be sold, used or caused to be used a large number of horse hay-rakes in infringement of your orator's rights as aforesaid, and have derived large profits therefrom, but to what amount your orator is ignorant and cannot set forth, and that your orator has been deprived by reason of said infringement of its rightful profits, and has thus incurred large damages thereby.

And your orator further shows that it fears and has reason to fear that unless the said defendants are restrained by a writ of injunction issuing out of this court they will continue to make or cause to be made, sell or cause to be sold, use or cause to be used
8 large numbers of horse hay-rakes embodying said invention, and thereby will cause irreparable injury to your orator's aforesaid exclusive rights.

In consideration whereof and forasmuch as your orator can only have adequate relief in this court of equity, to the end, therefore, that said defendants may, if they can, show why your orator should not have the relief herein prayed, and may, to the best and utmost of their knowledge, remembrance, information, and belief (but not under oath, an answer under oath being hereby expressly waived), full, true, direct, and proper answer make to all the matters and things stated and charged—

And that said defendants may answer the premises, and that they may be decreed to account with and pay over to your orator their said unlawfully realized profits and your orator's said unlawfully suffered damages, together with the costs of this suit:

May it please your honors to grant unto your orator the writ of injunction issuing out of this court, provisionally enjoining and re-

straining said defendants, Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, not to make, sell, or use, nor cause to be made, sold, or used, any horse hay-rakes or other machine or apparatus containing or employing the invention covered and secured by said letters patent during the pendency of this suit; and also the writ of injunction of this court perpetually enjoining and restraining said defendants, Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, not to make, sell, or use, nor cause to be made, sold, or used, any horse hay-rakes or other machine containing or employing the invention covered and secured by said letters patent, and that
9 your orator may have such other and further relief as the equity of the case or the statutes of the United States may require and to this court may seem just and proper.

May it please your honors to grant unto your orator not only the writ of injunction against the said defendants, Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, conformable to the prayer of this bill as above, but also a writ of subpœna directed to said defendants, Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, commanding them and each of them, on a day certain therein to be named, to be and to appear in this court, then and there to answer the premises and stand to, perform, and abide by such further order, direction, and decree as may be made against said defendants.

And your orator, as in duty bound, will ever pray, etc.

[SEAL.] ACME HAY HARVESTER CO.,
By JNO. E. KIRK, *President.*

PEIRCE & FISHER,
Solicitors for Complainant & of Counsel.

10 STATE OF ILLINOIS, }
County of Cook, } ss:

At the city of Chicago, in the county and State aforesaid, before me, a notary public duly qualified and empowered to administer oaths in said county, personally appeared John E. Kirk, who, being duly sworn, deposes and says: I am a resident of the city of Peoria, in the State of Illinois, and am the president of The Acme Hay Harvester Company, the complainant named in the foregoing bill of complaint. I make this affidavit for and in behalf of said company. I have read said bill and know the contents thereof. The allegations therein are true of my own knowledge, except as to such as are stated to be on information and belief, and as to these I believe the same to be true.

JNO. E. KIRK.

Subscribed and sworn to before me this 7th day of November, A. D. 1885.

[SEAL.] WILLIAM H. DYRENFORTH,
Notary Public.

Endorsed: Filed Nov. 11, 1885. Wm. H. Bradley, clerk.

11 On the same day, to wit, on the eleventh day of November, 1885, there issued out of said clerk's office a writ of subpœna in said entitled cause; which said writ, together with the return of the marshal thereto attached, are in the words and figures following, to wit:

Subpœna.

UNITED STATES OF AMERICA, *Northern District of Illinois,* } ss:

The United States of America to Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, Greeting:

We command you and every of you that you appear before our judges of our circuit court of the United States of America for the northern district of Illinois, at Chicago, in said district, on the first Monday in the month of December next, to answer the bill of complaint of The Acme Hay Harvester Company, this day filed in the clerk's office of said court, in said city of Chicago, then and there to receive and abide by such judgment and decree as shall then or thereafter be made, upon pain of judgment being pronounced against you by default.

To the marshal of the northern district of Illinois to execute.

Witness the Hon. Morrison R. Waite, Chief Justice of
[SEAL.] the Supreme Court of the United States of America, at
12 Chicago aforesaid, this 11th day of November, in the year of our Lord one thousand eight hundred and eighty-five, and of our Independence the 110th year.

WM. H. BRADLEY, *Clerk.*

Memorandum.

The above-named defendants are notified that unless they and each of them shall enter their appearance in the clerk's office of said court at Chicago aforesaid on or before the day to which the above writ is returnable, the complainant's bill will be taken against them as confessed, and a decree entered accordingly.

WM. H. BRADLEY, *Clerk.*

Special Deputy's Return.

UNITED STATES OF AMERICA, *Northern District of Illinois,* } ss:

Know all men by these presents that I have appointed, and by these presents do appoint, Wm. H. Dutcher my true and lawful deputy to execute the annexed writ, Acme Hay Harvester Co. *vs.* Stephen Martin *et al.*, and to make return of the execution thereof according to law.

November 11th, 1885.

F. H. MARSH, [SEAL.]
U. S. Marshal for the Northern District of Illinois.

I have served the annexed writ in the following manner, to wit: By personally delivering to each of the within-named Stephen Martin, Joseph B. Duncan, Charley O. Peters, and Thomas Martin a true copy thereof the 13th day of Nov., A. D. 1885. I also served the same upon the within-named Charles O. Smalley, not being able to find him to serve personally, by leaving a true copy thereof with his son, Frank Smalley, an adult person and a member of his family.

13

F. H. MARSH,
United States Marshal,
By WM. H. DUTCHER.

UNITED STATES OF AMERICA, *Northern District of Illinois,* } ss:

Wm. H. Dutcher, being duly sworn, deposes and says that he served the annexed writ as stated in the foregoing return, and that the expense returned by him in addition to the fees was actually incurred, and that the same is according to law.

WM. H. DUTCHER.

Subscribed and sworn to before me this 18 day of Nov., A. D. 1885.

EDWIN S. DAVIS,
[SEAL.] *Notary Public.*

Endorsed: Filed Nov. 18th, A. D. 1885. Wm. H. Bradley, clerk.

14 Afterwards, to wit, on the thirteenth day of January, 1886, in the December term of said court, 1885, in the record of the proceedings thereof in said entitled cause, before Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

Order.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN, THOMAS MARTIN, CHARLES O. Smalley, Joseph B. Duncan, and Charles O. Peters. } In Chancery.

The writ of subpœna heretofore issued in this cause having been duly served on the defendants above named and each of them and said defendants having failed to appear, as required by said writ, on or before the December rule day, A. D. 1885, to which said writ was returnable, and said defendants being now in default and having been duly called, on motion of complainant, by Peirce & Fisher, its attorneys, it is thereupon by the court ordered, adjudged, and decreed that the said bill of complaint be, and the same is hereby, taken *pro confesso* against the said defendants and each of them.

And the court doth further order, adjudge, and decree—

15 First. Complainant's letters patent number 259,550, on which this suit is brought, are good and valid letters patent and are owned by the complainant, as charged in the bill of complaint.

Second. Said defendants have infringed upon said letters patent by making and selling horse hay-rakes such as are described in said letters patent and referred to in the claim thereof.

Third. Complainant is entitled to have the perpetual injunction of this court restraining said defendants and each of them, their agents, servants, clerks, attorneys, and workmen, from making, vending, or using horse hay-rakes such as are described in said letters patent and referred to in the claim thereof, and said injunction is hereby ordered to issue.

Fourth. This case is hereby referred to Hon. Elijah B. Sherman, a master in chancery of this court, to ascertain and report the use, gains, profits, savings, and advantages which said defendants have realized through their unlawful infringement of said letters patent and the damages which complainant has sustained through defendants' said unlawful infringement of said letters patent.

16 Afterwards, to wit, on the twenty-fifth day of January, 1886, in the December term of said court, 1885, in the record of the proceedings thereof in said entitled cause, before Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

Order.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Chancery.

Now come the parties, by their solicitors, and upon stipulation filed it is ordered that the decree entered herein on the thirteenth instant be set aside, that the defendants have leave to enter their appearance herein as of the seventh day of December last, and that they answer herein by the fifteenth day of February next.

17 Afterwards, to wit, on the twenty-seventh day of January, 1886, came the defendants, by their solicitors, and filed in said clerk's office their appearance in said entitled cause; which said appearance is in the words and figures following, to wit:

Appearance.

United States Circuit Court, Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN, THOMAS MARTIN, CHARLES O. SMALLEY, JOSEPH B. DUNCAN, CHARLES O. PETERS.
} In Equity.

We hereby enter an appearance for the defendants in the above-entitled cause.

WEST & BOND,
Sol'rs for Def'ts.

Endorsed: Filed Jan'y 27, 1886. Wm. H. Bradley, clerk.

Afterwards, to wit, on the fifteenth day of February, 1886, came the defendants, by their solicitors, and filed in the office of the clerk of said court their answer to the bill in said entitled cause; which said answer is in the words and figures following, to wit:

18 Circuit Court of the United States, Northern District of Illinois.

The joint and several answer of Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, defendants, to the bill of complaint of The Acme Hay Harvester Company, complainant.

These defendants, now and at all times hereafter saving and reserving to themselves all manner of benefit and advantage of exception which may be had or taken to the many errors, uncertainties, and insufficiencies in the complainant's said bill of complaint contained, for answer thereto or unto so much or such parts thereof as these defendants are advised is material or necessary for them to make answer unto, answering, say as follows:

First. These defendants, answering upon information and belief, admit that letters patent of the United States No. 259,550, bearing date June 12, 1882, were granted and issued to one Martin H. Kenaga, substantially as in said bill alleged, except that they do not admit that the said Martin H. Kenaga was the true, original, and first inventor of said supposed improvement described and claimed in said letters patent.

Second. These defendants, further answering, aver that they have no knowledge except that derived from the bill relative to the alleged assignments of said patent, as set forth in said bill, by which the complainant became and now is possessed of the entire right, title, and interest in and to said letters patent No. 259,550, and therefore can neither admit nor deny the allegation of the bill relative thereto, and leave the complainant to make such proofs

19 thereof as it may be advised is material or necessary.

Third. These defendants, further answering on information and belief, deny that the said invention is of great value and utility, and that the same has proven profitable to the general public, and they aver that they have no knowledge as to the sale of large numbers of horse hay-rakes made in accordance with said invention, as alleged in said bill.

Fourth. These defendants, further answering, deny that they or either of them have, during and within the term of said letters patent and within the territory of the United States covered by said grant to the complainant, to wit, at the said city of Peoria, within said northern district of Illinois, and at other places within the United States, done any act with intent to deprive the complainant of any supposed profits arising from the supposed rights of the complainant under said letters patent by making and using said alleged invention, as alleged in the bill of complaint.

Fifth. These defendants, further answering, deny that they or either of them have unlawfully, wrongfully, or injuriously infringed any supposed right of the complainant under said letters patent by making or causing to be made, selling or causing to be sold, using or causing to be used any horse hay-rake containing and embodying the supposed invention of said letters patent either at Peoria, in the State of Illinois, or elsewhere in the United States.

Sixth. These defendants, further answering, deny that they have made or caused to be made, sold or caused to be sold, used or caused to be used a horse hay-rake infringing the supposed rights
20 of the complainant under said letters patent and containing or embodying the said supposed invention shown, described, and claimed in said letters patent.

Seventh. These defendants, further answering, aver upon information and belief that, prior to the supposed invention by the said Martin H. Kenaga of the matters and things shown, described, and claimed in said letters patent, the same matters and things or some material or substantial part or parts thereof were shown and described in letters patent of the United States as follows, to wit:

Letters patent No. 47703, dated May 16th, 1865, to J. Crellin; letters patent No. 49269, dated August 8, 1865, to F. Holden; letters patent No. 51450, dated December 12th, 1865, to R. H. Graham; letters patent No. 66352, dated July 2, 1867, to S. Johnson; letters patent No. 66696, dated July 16th, 1867, to H. V. Faries; letters patent No. 32935, dated July 3, 1861, to F. G. Wilson; letters patent No. 55672, dated June 19th, 1866, to J. King; letters patent No. 82345, dated September 22, 1868, to C. H. Dodge; letters patent No. 94889, dated September 14, 1869, to J. Hudson; letters patent No. 152,174, dated June 16, 1874, to J. Rumrill.

Eighth. These defendants, further answering, aver upon information and belief that at the date of the said supposed invention by the said Martin H. Kenaga of the matters and things embraced in said letters patent No. 259,550 it did not require invention, but only the skill of a mechanic, to combine the several parts composing the said supposed improvement or invention, and that therefore the said patent is wholly null and void.

Ninth. These defendants, further answering, admit that they have sold horse hay-rakes manufactured by the firm of Trumbull,
21 Reynolds & Allen, located at Kansas City, in the — Missouri, but they deny that said horse hay-rakes so sold by them infringe in any manner upon any supposed right of the complainant under said letters patent No. 259,550, or contain and embody the alleged improvement or invention set forth in said letters patent No. 259,550, and they aver that the horse hay-rakes so sold by them were made under and in accordance with letters patent of the United States No. 288,314, granted and issued November 13, 1883, to one John Dain, Jr., which said letters patent these defendants are informed and believe the said firm of Trumbull, Reynolds & Allen have the right to use in connection with the manufacture of horse hay-rakes similar to those sold by these defendants—

Without this, that any other matter or thing not herein or hereby

well and sufficiently answered unto, confessed and avoided, traversed or denied, is true to the knowledge or belief of these defendants; all of which things these defendants are ready to aver, maintain, and prove as this honorable court shall direct, and humbly pray to be hence dismissed with their reasonable costs and charges in that behalf most wrongfully sustained.

STEPHEN MARTIN.
THOMAS MARTIN.
C. O. SMALLEY.
JOSEPH B. DUNCAN.
CHARLES O. PETERS.

WEST & BOND,
Sol'rs and of Counsel.

Endorsed: Filed Feb'y 15, 1886. Wm. H. Bradley, clerk.

22 Afterwards, to wit, on the twenty-sixth day of February, 1886, came the complainant, by his solicitors, and filed in said clerk's office his replication to the answer in said entitled cause; which said replication is in the words and figures following, to wit:

Replication.

In the Circuit Court of the United States in and for the Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY, Complainant,
vs.
STEPHEN MARTIN *et al.*, Defendants. } In Equity.

This repliant, saving and reserving to itself all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereto saith that it will aver and prove its said bill to be true, certain, and sufficient in law to be answered unto, and that the said answer of the said defendants is uncertain, untrue, and insufficient to be replied to by this repliant; without this, that any other matter or thing whatsoever in the said answer contained material or effectual in law to be replied unto, confessed and avoided, traversed or denied, is true; all which matters and things this
23 repliant is and will be ready to aver and prove as this honorable court shall direct, and humbly prays as in and by its said bill it hath already prayed.

THE ACME HAY HARVESTER CO.,
By PEIRCE & FISHER, *Its Sol'rs.*

Endorsed: Filed Feb. 26, 1886. Wm. H. Bradley, clerk.

24 Afterwards, to wit, on the twenty-fifth day of May, in the adjourned May term of said court, 1886, in the record of the proceedings thereof in said entitled cause, before Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

Order.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Chancery.

On motion of Mr. Bond, leave is given defendants to file an amendment to the original answer herein, which is done.

On the same day, to wit, on the twenty-fifth day of May, 1886, came the defendants, by their solicitors, and filed in said clerk's office their amendment to their answer in said entitled cause; which said amendment is in the words and figures following, to wit:

Amendment to Answer.

United States Circuit Court, Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN, THOMAS MARTIN, CHARLES O. SMALLEY, JOSEPH B. DUNCAN, CHARLES O. PETERS.
} In Equity.

25 Leave of court being first had and obtained, defendants in this cause hereby amend their answer as follows: Page 5, after "letters patent No. 152,174, dated June 16, 1874, to J. Rumrill," add and insert as follows: "Also in letters patent of Great Britain No. 2736, of 1868, dated September 4, 1868 (provisional), to Thomas Perkins for improvement in elevators or apparatus to raise agricultural produce into carts or stacks."

STEPHEN MARTIN,
THOMAS MARTIN,
CHARLES O. SMALLEY,
JOSEPH B. DUNCAN,
CHARLES O. PETERS,
By WEST & BOND, *Sol'rs.*

WEST & BOND,
Sol'rs & of Counsel for Def'ts.

Endorsed: Filed May 25, 1886. Wm. H. Bradley, clerk.

26 Afterwards, to wit, on the eighteenth day of November, in the adjourned October term of said court, 1887, in the record of the proceedings thereof in said entitled cause, before Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

Order.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Chancery.

Now come the parties, by their solicitors, and this cause, being set for hearing this day, now comes on to be heard upon pleadings and

proofs, and, after hearing the arguments of counsel, the court takes the same under advisement.

27 Afterwards, to wit, on the ninth day of January, 1888, there was filed in said clerk's office the opinion of Judge Blodgett in said entitled cause; which said opinion is in the words and figures following, to wit:

Opinion.

United States Circuit Court, Northern District of Illinois.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Chancery.

BLODGETT, *J.:*

The bill in this case charges infringement by defendant of letters patent No. 259,550, granted to Martin H. Kenaga June 13, 1882, for "an improvement in horse hay-rakes," and asks for an injunction and an accounting for damages. The defendants do not deny the complainant's title, and only contend, first, that the complainant's patent is invalid for want of novelty in the device therein shown; and, second, that the defendants do not infringe.

The invention covered by this patent relates "to horse hay-rakes or sweeps of the class employed in connection with stackers, and particularly to those rakes of this class which are drawn by horses hitched one at each end."

It appears from the proof in this case, and this patentee recognizes it in his specification, that horse hay-rakes or sweeps
28 mounted upon wheels or runners, with such length of axle as to carry a rake head of from 10 to 12 feet in length, furnished with teeth for gathering the hay, so as to collect the hay upon a wide swath, by means of a horse attached to each end of such sweep or hay-gatherer, were old when this inventor entered the field.

It seems from the proof that this class of hay-gatherers are used principally either in connection with a "stacker" or for the purpose of hauling the hay to the place where it was to be placed upon the stack by means of pitchforks in the hands of workmen, and these old devices, as well as the device covered by this patent, are specially adapted for use in large fields or upon the prairie, where it is expected to stack the hay in the immediate vicinity of the meadow from which it is mown.

The invention covered by this patent consisted in attaching to each end of the rake head a pole or tongue whereby the movement of the rake could be to some extent guided, and by means of which the rake could be moved backward so as to unload the gathered hay from the rake by drawing the teeth from under the pile. In the old devices the horses were hitched to the end of the rake, usually by a whiffletree attached to the extremity of the axle extending beyond the outer end of the hub of the wheel, so as to give opportu-

nity for connecting the axle with the whiffletree, thus enabling the horses to travel clear of the rake teeth.

29 The horses were ridden by boys and the rake was guided by the movement of the horses, and when a load had been accumulated upon the rake teeth the rake was not dumped, but the horses were wheeled about, one to the right and the other to the left, so as to move in the opposite direction from that in which the hay had been gathered, and the rake thereby drawn backward so as to withdraw the teeth from the pile of hay that rested upon them. Kenaga attached to each end of his rake head a bar to which the whiffletree was attached, and also a tongue or pole projecting forward in order to fasten the breast-strap from the horses' hames or collar to it for the purpose of aiding the horses in guiding the movements of the rake, and also to furnish means by which the horses could back the rake, when it was desired to do so, either for the purpose of unloading or for any other reason; and it is the addition of this pole to the old form of sweep or hay-gatherer that is covered by this patent. The patent also shows a seat placed upon the rake head where the driver can ride and guide the horses; but the claim of the patent only covers the attachment of these two guiding poles to the rake head, and does not cover either the seat or whiffletree bar.

30 The proof shows that it was old to use poles or thills for the purpose of guiding horse-rakes, as well as nearly every other class of vehicles mounted upon wheels to be drawn or propelled by animal power, and it seems quite clear that if it was found desirable in use to have some device attached to these rakes by which they could be backed from under the accumulated load there was no invention in attaching a pole or tongue to a rake head for that purpose. The tongue of the horse-rake for the purpose of guiding or backing the machine was an old and well-known device. The probability is that in the earlier rakes of this description, such as that shown in the Hudson patent of September, 1869, and of which complainant's patent was an improvement, it was not deemed desirable to apply any device for backing, as those rakes were organized and handled mainly by means of a boy mounted upon each horse, and the rake was guided by the movements of the respective horses, and the backing or reverse movement now accomplished by means of this pole was, as it was thought, sufficiently provided for by simply swinging the horses around so as to reverse their direction of travel, and thereby draw the rakes back instead of pushing them back by means of a tongue or pole.

31 If a person using such a rake conceived the idea that it would be more convenient to handle the rake to some extent by means of a guiding pole or backing pole like that shown by this patent it seems to me that with the common knowledge which exists among all those who have been in the habit of using horse-rakes, that they had been backed and guided by means of a pole, there was no invention in applying a pole to rakes of this kind for that purpose.

It appears quite clearly, I think, from the proof that hay-gather-s

with poles have substantially superseded the older form, and I should say from the evidence that they are shown to be a manifest improvement upon the older form, but all improvement is not invention. With the well-known advantages in the ordinary horse-rakes of guiding and backing them by means of a pole there could, it seems to me, be no invention in merely adapting from the older form of rakes this well-known element, and all that can be said is that the earlier forms of this sweep or hay-gatherer were incomplete until the pole was attached. The Hudson rake of 1869 contained in its drawings and specifications the suggestion of a pole, but no provision was made for attaching the pole to the hame or collar of the horse so as to enable him to use it for the purposes of backing, its function or office in the Hudson organization seem-

32 ing to be merely to enable the rider of the horses to lift the teeth of the rake from obstructions by means of these "levers," as they are called; but, from the evidence as to the manner in which the old rakes were used, I think it must be manifest that they aided to some extent in the guiding of the horses, because, as the horses were hitched outside of these levers, as they projected forward parallel or nearly so with the rake teeth, when it was desired to swing the machine around or turn it either completely about or half round or considerably vary its course the slacking or stopping of one horse and swinging the other in the direction in which it was desired to turn of course produced the desired movement of the machine, and the horse describing the circle or the arc of a circle in which the machine traveled would be kept from stepping upon the rake teeth, and, in a certain sense, kept to his work by means of these levers extending along his side, while the horse standing nearly still or slacking his movement would be also guided by the movement of the lever along his side so as to correspond with the movement of the other end of the rake. While I am clear that it did not require invention to take the pole from the wagon or mowing machine or horse-rake or cultivator in

33 use before the device covered in this patent was shown, there was still less invention, as it seems to me, required to convert the suggestion of the usefulness of the pole in the Hudson rake into the pole shown in the complainant's patent than would be necessary had there been no Hudson rake in the prior art. In other words, it seems to me that without the Hudson rake and its levers, intended to specially aid in lifting its teeth over obstructions, there would have been no invention in applying the pole to the rake if a pole was found desirable for any purpose; yet, with the Hudson rake in the field, there was certainly no invention in applying a breast strap from the collar of the horse to the forward end of it to use it for the purpose of guiding the machine or backing it, as is done in the complainant's patent. Hudson, it seems to me, could not have sustained a claim for a guiding pole to his rake as a new invention or even as a combination, because guiding poles were old; and if he could not have done so certainly Kenaga cannot be allowed to do so. It seems to me, therefore, that the defense of want

of novelty is fully established by the proof in this case, and that this bill should be dismissed because of the invalidity of the patent.

Endorsed: Filed Jan. 9, 1888. Wm. H. Bradley, clerk.

34 On the same day, to wit, on the ninth day of January, 1888, in the December term of said court, 1887, in the record of the proceedings thereof in said entitled cause, before Hon. Henry W. Blodgett, district judge, is following entry, to wit:

Decree.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Chancery.

Now come again the parties, by their solicitors, and the court, having considered and being fully advised upon the matters herein, orders that the bill be dismissed for want of equity at complainant's costs, and that execution issue therefor.

Thereupon the complainant prays an appeal herefrom to the Supreme Court of the United States, which is allowed upon its giving bond according to law in the penal sum of one thousand dollars, with surety to be approved by the court.

35 Circuit Court of the United States for the Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN, THOMAS MARTIN, CHARLES D. SMALLEY, JOSEPH B. DUNCAN, and CHARLES O. PETERS.
} In Equity.

Testimony taken on behalf of the complainant in the above-entitled cause, pursuant to an agreement of the parties thereto, taken before H. M. Munday, a notary public in and for Cook county, in said district, by consent of parties to said suit, on the third day of April, A. D. 1886, at the office of Messrs. Peirce and Fisher, at room 67 Honore building, No. 204 Dearborn street, Chicago, in said district, commencing at ten o'clock in the forenoon.

Present: George P. Fisher, Jr., Esq., on behalf of complainant, and O. W. Bond, Esq., on behalf of defendants.

And thereupon the following proceedings were had:

It is agreed between counsel for complainant and defendants that uncertified copies of all assignments and agreements relating to the letters patent No. 259,550, granted to Martin H. Kenaga June 12, 1882, and copies of letters patent or of the specifications and drawings forming part thereof and properly introduced
36 in evidence may be admitted and considered in this cause and on appeal the same as if duly certified.

Counsel for defendants admits that the complainant herein is a corporation duly created and existing in manner and form as alleged in the bill of complaint, and is the party of that name mentioned in the assignments hereafter referred to, and further admits that letters patent of the United States No. 259,550 were granted and issued to Martin H. Kenaga on June 13th, 1882, for the alleged invention claimed in the specification annexed to and forming part of said letters patent, and further admits that the defendants have offered for sale and sold since the date of the patent No. 259,550 and prior to the commencement of this suit and are at the present time offering for sale horse hay-rakes like that shown in the model hereafter introduced in evidence and marked "Complainant's Exhibit Defendants' Rake."

Counsel for complainant offers in evidence copy of the specification and drawing of letters patent 259,550, M. H. Kenaga, dated June 13, 1882, for horse hay-rakes, and the same is marked "Complainant's Exhibit Kenaga Patent."

Also copy of an assignment from Martin H. Kenaga to William F. Kenaga, the same being marked "Complainant's Exhibit A."

Also a copy of an assignment from William F. Kenaga to the Acme Hay Harvester Company of Peoria, Illinois, and the same is marked "Complainant's Exhibit B."

Also copy of an assignment from William F. Kenaga and
37 Martin H. Kenaga to the Acme Hay Harvester Company, the same being marked "Complainant's Exhibit C."

Also a model of a horse hay-rake, and the same is marked "Complainant's Exhibit Defendants' Rake."

And thereupon MELVILLE E. DAYTON, a witness on behalf of complainant, was produced, and, being first duly sworn, testified, in answer to interrogatories propounded to him by GEORGE P. FISHER, Esq., of counsel for complainant, as follows:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Melville E. Dayton. I am 50 years old; reside in Chicago, Illinois, and am a mechanical engineer and solicitor of patents.

Q. 2. State, generally, the nature and extent of your experience in the examination and comparison of mechanical contrivances, particularly in connection with questions of fact arising in patent causes.

A. Since boyhood I have been familiar with mechanics and machines, both practically and theoretically. For the past 15 years I have had experience as a solicitor of patents, and have prepared specifications and drawings for many hundreds of patents. For the last ten years I have had large and constant experience in the investigation of patents and machines, and besides, having testified in scores of patent suits, have prepared a great many opinions on questions of patents or of correspondence and differences between mechanisms.

Q. 3. Please examine Complainant's Exhibit Kenaga Patent

38 and state whether you have read and understand the same and the construction of the device therein described.

A. I have examined said patent and understand it and the construction of the device therein described.

Q. 4. State what device you find described in such patent and particularly pointed out in the claim at the end of the specification thereof; also consider the device as defined in said claim in connection with Complainant's Exhibit Defendants' Rake 'after you have carefully examined said model and state what bearing, if any, in your judgment, in the matter of similarity or identity the said patent has upon the construction shown by said model.

A. The device set forth in the Kenaga patent and made the subject of the single claim thereof is the combination, with a horse hay-rake of that class used for raking hay to the foot of stacking machines and which have the two horses independently attached at the opposite and remote ends of the rake, of projecting draft bars, to which the horses are severally attached for the purpose of pulling the rake forward, and projecting poles, to which the horses are severally hitched forward to enable them to push back the rake from under the hay after it has been drawn up to the stacker by a backing movement of the horses, both the drafts bars and the backing poles being attached to the body of the rake or rake head.

I have examined the model referred to in the question and understand its construction and operation.

Comparing said model with the description and claim of complainant's patent, I find that the model contains the same devices constructed and arranged in essentially the same way and
39 operating identically in the same manner to produce the same results as set forth in said complainant's patent and pointed out in the claim thereof.

The defendants' rake (represented by the model) is one of those transversely long rakes which are specially designed for use in hauling hay to the foot of a stacker. It has "projecting draft bars" attached to the body of the rake and projecting at either end thereof for hitching the horses in position to travel alongside the rake. These draft bars answer exactly to the draft bars B of complainant's patent. I also find in said defendants' rake two stiff poles attached to the ends of the body of the rake and projecting forwardly so as to bring their front ends in the neighborhood of the breasts of the horses. These poles answer perfectly to the poles C C of complainant's patent and claim. I also find at the front ends of the poles in defendants' rake provisions for the attachment of the horses to said poles by breast straps, such provisions consisting of the eyes or loops fastened to the ends of the poles to admit the breast strap. These answer perfectly to the hooks *c* shown in the patent sued on. In the use of defendants' rake the horses are severally hitched to the projecting draft bars by means of tugs and whiffletrees and to the forwardly projecting backing poles by means of breast straps, precisely as contemplated in complainant's patent, and the rake is managed in being backed out from under the load by a backing movement of the horses in one case precisely as in the

other. The advantages set forth in complainant's patent are also, and therefore perfectly, realized in defendants' rake—that is to say, the horses, being thus hitched to the rake to allow of their being backed and to hold them from swinging around independently, are manageable and are managed by a single driver, who may
40 walk behind or ride upon the rake, and who, in this position, has perfect control over the team and the various required movements of the rake.

I notice, of course, that the forwardly projecting stiff backing poles of defendants' rake are hinged to the body of the rake so as to have a vertical adjustment, while in complainant's patent the corresponding poles C C are apparently rigidly attached to the body or head of the rake. This difference in construction, in my judgment, does not take the said defendants' rake out of the range of said complainant's patent or its claim, because I do not find anything in said patent or claim which restricts them to the rigid connection of the backing poles to the rake head or body. The patent says, at lines 47 to 53, "C C are stiff poles secured permanently or removably to the ends of the rake head, and, as here arranged, directed forward, upward, and outward therefrom, so that the free front end of each is in position to allow the adjacent horse to be hitched thereto by a breast strap." Neither here nor elsewhere in the patent do I find anything to inhibit the vertical adjustment of the free ends of the backing poles C C; but, on the other hand, I notice that the said poles C C, though not hinged to the rake head, are so connected at two points that the front end of said poles may be raised or lowered—that is to say, by inserting a block between said pole and either of the two parts of the rake head to which it is attached. The quoted words, "C C are stiff poles secured firmly or removably to the rake head," moreover, to my mind, indicate that the patent was not intended to be restricted to the precise form of attachment by which said poles are shown to be secured to said rake head.

Further, I observe that thills attached to the draft bars B B
41 are mentioned in the patent as the equivalent of the poles C C; and, as thills are ordinarily attached to those vehicles or implements with which they are used by hinge connections which permit vertical movement thereof, I see no departure from the invention stated in the patent in the hinged connection of the backing poles with the rake head shown in the model of defendants' rake.

I also notice in said defendants' rake, first, that each of the poles itself is attached to the rake head short distance inwardly from the extreme end of the latter, and, second, that each of said poles is provided with a brace secured to the rake head nearer and very near the extremity of said rake head. This I regard as clearly within the purview of the patent, because said patent is not for the precise construction or form of connection of the backing poles with the rake head, but for the presence and general location of such poles in combination with the rake proper and its draft bars, substantially as shown in the patent, whereby certain utilities and modes of operation are obtained which have been shown to be the same in defendants' rake as set forth in complainant's patent.

I notice further that the pole braces in defendants' rake are directly attached to the prolongations of the draft bars. If this be thought to be a departure from the invention in complainant's patent I do not so regard it, for such prolongation of the draft bar forms a bracing part of the rake head, so that said construction of defendants' rake is still within the terms as well as within the spirit of complainant's patent and claim.

Referring again to the hinged connection of the backing poles with the rake head in defendants' rake, I call attention to the
42 staples which may hold the brace firmly up against the top beam of the rake head or against a block inserted between said brace and beam, whereby it is the evident intention to make the backing pole rigid with the rake head vertically as well as laterally for use, so that the hinges of said poles after all may serve only as convenient means for vertical adjustments of said poles. The absence or disuse of such clamping staples, however, still leaves the construction of defendants' rake, in my judgment, clearly within the intent and the terms of complainant's patent.

Q. 5. What do you understand to be the "rake head," as referred to in your previous answer?

A. In the sense in which the term is used in the patent I understand it to be the rigid body of the rake structure which is directly supported by the wheels and from which the teeth forwardly project. I do not understand that term as being applied to any particular beam or member of this rigid part of the structure, but to the entire rigid part or body of the rake which I have just mentioned.

Cross-examination by O. W. BOND, Esq.:

X Q. 1. Does not the Kenaga patent, complainant's exhibit herein, state that the projecting arms to which the horses are attached are the usual or any desired form?

A. Yes.

X Q. 2. Do you understand from anything found in the description of the rake and rake head in the Kenaga patent that these parts are different in construction from other forms of rake heads and rakes?

Question objected to for indefiniteness.

Answer. The patent has reference specifically to that class of rakes which are intended for use in connection with stacking ma-
43 chines and to which the horses are attached at the extreme sides or ends of the rake. I do not understand that the patent intends to point out a particular construction in such rakes or rake heads.

X Q. 2½. What new feature or operation is produced by the rake head and rake shown in the Kenaga patent, if any, beyond what was old at the date of said patent and in hay-rakes generally, so far as the description of the patent shows?

A. The rake proper does just what this sort of rake did before, being allowably an old rake itself.

X Q. 3. Does not the draft bars of the model, "Complainant's

Exhibit Defendants' Rake," answer exactly to the usual or any desired form of draft bars for rakes, as well as for the draft bars B of complainant's patent?

A. They do as to position and form, but not as to use with the pole C. In this respect they correspond exclusively with the draft bars of complainant's patent, wherein they are used solely for the purpose of drawing the rake forward and not for drawing it backward, as in the former construction of rakes from which the backing poles were absent. In defendants' rake, as in complainant's patent, the backing poles C C supplant the old function of the draft bars for withdrawing the rake from under its load.

X Q. 4. Whether they perform only the functions of a hitch for drawing the rake forward or of furnishing a means for both drawing and backing the rake would depend on the hitch used in connection with the bars, not from any novel feature of the bars themselves, would it not?

A. That is true. The draft bars are only the old form of such bars.

X Q. 5. Splitting the reins back to a point in convenient reach of the driver, enabling the driver to handle either horse independently of the other, was not new at the date of the Kenaga patent, was it?

44

A. I don't know whether it was or not; I do not know that it was not.

X Q. 6. Is not the connection shown in the drawing of the Kenaga patent of the poles to the rake head, when construed in connection with the words "permanently or removably," a connection by means of a bolt or other instrumentality which hold the bolts in a permanent position, leaving them capable of being removed if so desired?

A. The drawing undoubtedly shows the poles bolted or pinned to the rake head. The words "secured permanently or removably" I understand to indicate the allowability of other than this form of attachment, which will commonly, I believe, be understood to be a permanent one, though not so certainly a permanent one as though the poles were framed in with the members of the rake head.

X Q. 7. If either one of the two bolts used for attaching the rear end of the pole to the rake head were removed, would you then have a rigid pole in the sense intended by the patent?

A. You might or you might not. I should think, from looking at the drawing, that the rear-end bolt might be removed from each pole and the latter serve the purpose intended. This would be the case if the other bolt should prove sufficient to hold the pole up at its front end and its rear end down, because in that case the rear end of the pole will apparently have a side bearing against the adjacent rake tooth (as it happens to be shown in the drawing), by which the pole would be enabled to meet the back pull thereon. Lateral rigidity of the pole with the rake is all that is in any case required in the connection, but the pole itself should be "stiff."

45

X Q. 8. Would not the pole, with the rear end unattached, be free

to swing inward at its forward end laterally, throwing the rear end outward to engage the wheel in the construction referred to?

A. Apparently, if there were anything to push it inward far enough.

X Q. 9. With one point of attachment only is not the pole a free one instead of a rigid one laterally?

A. It would be free to move in one direction in the particular construction pointed out in the drawing, but the pole itself would still be stiff. To give the pole but one point of attachment by a pivot, so as to allow free lateral movement to any great extent, would, in my judgment, be unmechanical and probably less desirable than a connection which gives lateral rigidity with the rake head.

X Q. 10. Please point out the language in the specification by which provision is made in the patent for a vertical adjustment of the free end of the pole by the use of a block, as testified to by you.

A. There is no such language. The adjustment referred to by me would be the expedient of a very ordinary mechanic.

X Q. 11. You have testified as to thills being attached to the draw bars as being found in the patent as equivalent of the poles C C. Is that statement correct?

A. I think so. My reference was to lines 68 to 76 in the specification (wherein I notice the letter B is misused for the letter C).

X Q. 12. When thills are so employed do you understand from the patent that the poles C C are to be dispensed with?

46 A. As a backing device, yes.

X Q. 13. Where and in what manner does the patent set forth that thills are to be attached?

A. In the paragraph just referred to, which says "a pair of thills may be connected with each of the arms B B."

X Q. 14. Does the patent set forth any special mode of attaching the thills to the draw bar?

A. It does not.

X Q. 15. The ordinary and well-known slip and eye generally used for attaching thills to vehicles could be used for attaching the thills to the draw bar, could they not?

A. I think so.

X Q. 16. It is on this well-known hinge connection for the attachment of thills that you base your conclusion as to there being no departure from the patent when the backing poles have a hinge connection, is it not?

A. No; not wholly. That is my opinion, without reference to what the patent says about thills or to what is known of the ways of hinging thills. It would be my opinion if there were nothing said about thills in the patent. Perhaps the hinging of a pole might be an improvement, but it would not be a departure from the invention, as claimed in the patent.

X Q. 17. Would the attachment of the thills by hinge connection to the head of the rake instead of to the draw bar be a departure from the patent?

A. As I understand the question, I think it would, because the draft bar is specified as an element of the combination, and the

statement relative to the thills is that a "pair of thills may be connected to each of the arms B B, * * * which would be an equivalent of the construction shown in the drawing." It
47 would moreover be a departure from common use and utterably impracticable, for it is the essence of this invention that the horses are located at the ends of the rake, which requires the draft bars B or their equivalents to be present in order to give the horses this position.

X Q. 18. The patent itself makes a permanent or removable stiff pole attached to the rake head the equivalent of thills attached through the draft bar, the manner of attachment being left to the mechanic, does it not?

A. The patent states that such thills attached to the draft bars without specifying any particular form of attachment would be the equivalent of the pole C attached to the rake head.

X Q. 19. What purpose is subserved by raising or lowering the free end of the pole which you have testified to?

A. The poles C C, as shown in the drawing and stated in the patent, are "directed forward, upward, and outward" from the rake head, "so that the free front end of each is in position to allow the adjacent horse to be hitched thereto by a breast strap." I should say the free end of the pole would be raised or lowered (if raised or lowered at all) for the purpose of bringing said free or front end in proper relation to the horse when not originally constructed with the proper elevation.

X Q. 20. This requirement, at a proper elevation of the free end of the pole C to suit the horse, is not set forth as a feature in the patent, is it?

A. It is not.

X Q. 21. The object of the rigid pole or of the thills is the backing of the rake, is it not?

A. To permit the horse to back the rake—yes.

48 X Q. 22. The patent itself makes the pole C and the thill the equivalent one of the other in backing the rake by the horse.

A. The patent states the thills to be the equivalent of the pole for this purpose.

MELVILLE E. DAYTON.

Subscribed and sworn to before me this 3rd day of April, 1886.

[SEAL.] H. M. MUNDAY,
Notary Public.

49 STATE OF ILLINOIS, } ss:
County of Cook, }

I, H. M. Munday, a notary public in and for said county of Cook, do hereby certify that on the third day of April, A. D. 1886, the day named in the deposition hereto annexed, I was attended at room No. 67 Honore block, 204 Dearborn street, Chicago, in said district, by the counsel and witness aforesaid; that the said witness was by me duly sworn and examined, and his deposition was reduced to

writing and read to him by me and by him subscribed in my presence, and that the following exhibits, to wit:

"Complainant's Exhibit Kenaga Patent,"
"Complainant's Exhibit A,"
"Complainant's Exhibit B,"
"Complainant's Exhibit C,"
"Complainant's Exhibit Defendants' Rake" were introduced in evidence and identified by my signature.

Dated at Chicago, Illinois, April 3, 1886.

[SEAL.] H. M. MUNDAY,
Notary Public.

Notary's fees:

35 folios	$7 00
Marking exhibits (5)	50
Certificate	2 00
Paid by compl't	$9 50

50 United States Circuit Court, Northern District of Illinois.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.* } In Equity.

At Chicago, Illinois, on the 26th day of April, A. D. 1886, before Albert H. Adams, a notary public.

Present: J. H. Peirce, Esq., for complainant; O. W. Bond, Esq., for defendants.

At 11.30 o'clock in the forenoon the parties to the above cause, by their counsel as above, met at the office of Messrs. Pierce & Fisher, rooms 66 and 67, No. 204 Dearborn street, Chicago, Illinois, by agreement, where the following proceedings were had:

JOHN E. KIRK, a witness produced on behalf of the complainant, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by JAMES H. PEIRCE, Esq., as follows:

Int. 1. Please state your name, age, residence, and occupation.

Ans. John E. Kirk; age, 36; residence, city of Peoria, Illinois; am the president and general manager of The Acme Hay Harvester Company, the complainant in this cause.

51 Int. 2. State what is the business of that company.

Ans. The manufacture and sale of hay rakes or gatherers and hay rickers or loaders.

Int. 3. How long has that company been engaged in that business?

Ans. Since the organization of that company, which, I think, was in the latter part of 1883.

Int. 4. How long have you been president and general manager of the company?

Ans. Ever since its organization.

Int. 5. Has the company been making hay-rakes and hay-rickers since it first began business?

Ans. It has.

Int. 6. State what, if any, experience you had in the manufacture and sale of hay-rakes prior to your connection with the Acme Company.

Ans. I first began the manufacture and sale of hay-rakes and hay-stackers in 1876, at Salisbury, State of Missouri, in a small way at first, making only eight or ten rakes and four or five rickers in the year 1876. In 1877 I made about one hundred and fifty rakes, partly at Salisbury, Missouri, and partly at Rennick, Randolph county, Missouri. While at Rennick they were made by Grant & Williams, under contract, for me. From that year up to and including the year 1883 I had rakes made under contract at Salisbury, Missouri, and Breckenridge, Caldwell county, Missouri, and Peoria, Illinois, making variously from one hundred and fifty to twelve hundred rakes in the year 1883.

Int. 7. When you first began the manufacture of rakes at Salisbury, Missouri, as you have stated, what kind of a rake was it that you made and sold?

52 Ans. It was a long wooden sweep-rake, about twelve feet long, with wooden teeth about eight feet long, mounted on cast-iron runners, and it was operated by hitching a horse at either end and a boy riding each horse. The rake would be drawn backward in the field to the place of commencing to rake, and the boys would turn the horses and travel in the direction of the stack, gathering the hay on the rake.

Int. 8. State how such rake would be operated to discharge the load therefrom.

Ans. The horses would be turned around and the rake withdrawn from the load.

Int. 9. How would the horses be turned around?

Ans. Each boy would turn his separate horse, one turning to the right and the other to the left, and travel in the opposite direction from that traveled in gathering the hay on the rake.

Int. 10. What was the mode of attachment of the horses to such rake in order to allow the rake to gather and to be unloaded as you have described?

Ans. Each horse was attached at each extreme end of the rake by means of a rope or chain about ten feet long.

Int. 11. Have you a sketch or cut of the kind of rake you have referred to; and, if so, will you please produce the same?

Ans. I have; and here it is.

Witness produces a cut, which is offered in evidence and marked "Exhibit Kirk Drag Rake."

Int. 12. State what, if any, objections in practice were encountered in the use of any such rake, referring to the sketch, if you please, in connection with the explanation you make.

53 Ans. First, it requires two riders or drivers old and intelligent enough to guide and manage the rake and at the same

time not so large as to overburden the animal when necessary to ride, and if rake teeth (or tooth) should strike an obstruction or bunch of wet hay catch on point of tooth or run into the ground it was necessary, in order to get the backward motion of the rake to free the tooth or teeth from said obstructions, that the horses should be turned right about, causing the single-trees to hit the horses' heels and tugs becoming unhooked, necessarily making it rather slow and unpleasant to operate compared with our later forms. It also made it very heavy and hard on the animals to draw such rakes. I will further state that the horses' feet were liable to become entangled in the teeth of such rakes, and especially so if a tooth near one end or the other should run into the ground, thus giving the horse whose end was free leverage that would cause him to pull the rake around on the horse whose end was fast and not only break the teeth of the rake, but knock the horse's feet from under him and cause him to fall, sometimes crippling horse and rider.

Int. 13. State how long you continued in the manufacture and sale of such rakes, giving the number of rakes during each year or season.

Ans. I was engaged in the manufacture of such rakes from 1876 to 1882, inclusive. In 1876 I made about eight or ten such rakes; 1877, about one hundred; 1878, about one hundred and fifty; 1879, about three hundred; 1880, about three hundred and fifty; 1881, about six hundred; 1882, about seven hundred and fifty.

Int. 14. State whether the construction of rake as shown in Exhibit Kirk Drag Rake was the only kind of such rake made
54 by you during the years mentioned; and, if not, state what the other kinds were.

Ans. About the year 1879 or 1880 I slightly changed the form or construction of the head of said rakes, putting in what I termed truss blocks. They were to prevent the rake from sagging, and also to keep the hay from working back over the head, thus scattering the hay. This so-called truss head was also lighter and stronger than the way I before made them. In the years 1880 and 1881 I also made a few rakes with trucks and tongue, providing means whereby a team of horses could be hitched directly behind the rake and shove the rake with the load, and guided by means of the trucks and rudders, something on the principle of a header for harvesting grain. The objections I found to this kind of a rake were its weight and necessarily being very long, unwieldy, and it required a strong expert man to operate them, and by reason of the horses being hitched so far in the rear of the load made the draft very heavy, and in uneven meadows when the rake became loaded, if the wheels or truck on which the driver sat would be on higher ground than the rake proper with the load, the line of draft would be such as to raise the driver, truck, and wheels off of the ground and prevent the rake from being shoved along with the load, as desired. It was also impossible to get the hay from the corners of the fences, as it was necessary to begin to circle before getting to the corner in order to make the turn.

Int. 15. Referring to the form of the rake first mentioned by you

in the last answer, please state how, if at all, such form of rake differed as to the mode of hitching the horses thereto from that which you had previously employed.

55 Ans. There was no material difference other than in the later form. A draft bar was extended about four feet outward from the teeth and provided a means of hitching the horses near the load, and more nearly opposite each end of the rake, not requiring so long a hitch.

Int. 16. What kind of a hitch was used in this improved form?

Ans. Simply a clevis attached to the draft bar, as before stated, to which was connected a single-tree to which the horses were attached by means of their tugs.

Int. 17. What do you mean by a tug?

Ans. I mean that part of the harness by which the load is drawn, connected to the collar or hames on the harness.

Int. 18. What was it made of?

Ans. Some of them used ropes and some of them were made of leather.

Int. 19. If you have any sketch showing this modified form of rake you will please produce the same.

Ans. Here it is.

Sketch produced by the witness offered in evidence, and the same is marked "Kirk Exhibit B."

Int. 20. Please compare the "Exhibit Kirk Drag Rake" with the "Kirk Exhibit B" and state how, if at all, the hitch shown in the rakes of said exhibits respectively differ, substantially, from each other.

Ans. As I have heretofore stated, there is no material difference.

Int. 21. Is the hitch in both flexible or rigid?

Ans. They are flexible in both, and to discharge the load

56 the horses are operated the same, being turned right and left around, moving in the opposite direction to leave the load where desired.

Int. 22. These forms of rake shown by the exhibits just specified are commonly known in the trade by what term?

Ans. By various terms—"the Long-Tom sweep," "gatherers," and "Go Devils" and "drag-rakes," generally termed "drag-rakes."

Int. 23. Were the forms of such drag-rake shown by said exhibits mentioned the only kinds thereof known to you during the time you were making the same?

Ans. They were not.

Int. 24. How, if at all, did such other forms of drag-rake differ materially as to the mode of hitching the horses thereto from the mode you have described in connection with said exhibits?

Ans. They did not differ materially. The hitch and mode of operating were substantially the same, so far as I knew.

Int. 25. In your answer to question 14 you mention the making in the years 1880 and 1881 a few rakes with trucks and tongue, provided with means whereby a team of horses could be hitched

directly behind the rake. About when did you first have knowledge of such construction of rake?

Ans. I think it was in the latter part of 1879.

Int. 26. Can you furnish a sketch or picture illustrating such type of rake wherein the team was hitched back of the rake body?

Ans. I can; here it is.

Sketch produced by the witness offered in evidence, and the same is marked "Kirk Exhibit C."

57 Int. 27. Aside from the shove-rake last mentioned shown by Exhibit C and the drag-rake before referred to, were there any other kinds than these in use, to your knowledge, adapted for use in conjunction with hay-rickers prior to the invention of Kenaga in this suit?

Ans. There were not.

Int. 28. Please state, if you know, about what was the average price of a drag-rake of the kinds hereinbefore referred to to the user.

Ans. From fifteen to twenty-two and a half dollars.

Int. 29. And the price of the push-rake—what was that?

Ans. Thirty-five dollars; from thirty to thirty-five dollars.

Int. 30. When did you begin the manufacture of the hay-rake like that shown and described in the letters patent of Martin H. Kenaga, No. 259,550, dated June 13, 1882, now in controversy?

Ans. In the fall of 1882.

Int. 31. Where were you then engaged in business?

Ans. At the city of Peoria, in the State of Illinois.

Int. 32. Were you then in business for yourself; or, if not, how were you engaged?

Ans. I was engaged in business for myself individually.

Int. 33. State the circumstances which induced you to begin the manufacture of such Kenaga rakes.

Ans. Having sold Martin H. Kenaga, the inventor of said rake, hay-rickers and hay-rakes, which he had been using for several years, putting up large quantities of hay in Kankakee county, Illinois. When Mr. Kenaga made his first rake he invited me to go over and witness the working of it. I went during the hay
58 harvest of 1882, and there witnessed the working of said rakes, and was fully convinced by means of Kenaga's invention said rakes were made much more practical and desirable than any I had ever previously seen, used, made, or seen used.

Int. 34. State generally what was the feature of such Kenaga rake which you saw in operation in 1882, distinguishing the same from the rakes with which you were previously familiar.

Ans. Kenaga had provided tongues or poles on either end of the rake for independently attaching each horse by breast strap of the harness, providing a hitch and arrangement of the lines whereby one driver could guide and manage the team much easier, both to the team and to the driver, than any rake I had ever seen of like class.

Int. 35. State how that rake which Kenaga then showed you was operated to withdraw it from the load.

Ans. It was backed out by the horses by means of the tongues attached at each end of the rake.

Int. 36. You may state about what number of such rakes from year to year has been manufactured by you or your company since you first began, in 1882.

Ans. In 1882 I only made six or eight for exhibition at various State and district fairs. In 1883 I made twelve hundred of said rakes and made and sold about three hundred attachments, consisting of tongues, wheels, seat, and spring to change the drag-rakes I had before made into rakes of the Kenaga construction. During the year 1883 I was indirectly interested in the so-called Milan Manufacturing Company, located at Milan, Missouri, who made about one thousand of said rakes. In 1884 the Acme Hay Harvester Company of Peoria, Illinois, made twenty-one hun-
59 dred of said rakes and about three hundred attachments to change drag-rakes before made and sold to the Kenaga construction. In 1885 the Acme Hay Harvester Company made twenty-eight hundred, and in 1886 we have finished and in the course of construction three thousand.

Int. 37. Were the Kenaga rakes made by you or your company so made by license from said Kenaga; or, if not, how otherwise?

Ans. For the first I made Mr. Kenaga did not charge me any royalty, as he desired to have them introduced. From and including the year 1883 I manufactured under royalty up to the time of the purchase of his patent by our company—that is, the Acme Hay Harvester Company.

Int. 38. Can you produce a sketch or cut showing the Kenaga rake in the form in which it is now made by your company for the market?

Ans. I can. Here it is.

Pamphlet produced by witness offered in evidence and marked "Exhibit Acme Pamphlet."

Int. 39. Refer to the "Exhibit Acme Pamphlet" and state where such forms of rake are shown therein.

Ans. On pages two, four, and five, and also on the front and back of the cover.

Int. 40. Refer to the sketches shown on pages four and five of said exhibit and state how, if at all, the rakes there shown differ in respect to the poles at the sides of the rake to which the horses are hitched.

Ans. They do not differ at all.

Int. 41. In your answer to question 36 you mention the making of certain attachments whereby the old forms of drag-rake
60 previously made by you could be converted into rakes of the Kenaga pattern. What led you to make such attachments?

Ans. By reason of the urgent demand upon me by my old customers, to whom I had sold the old style of drag-rakes.

Int. 42. Why did they make this urgent demand?

Ans. For the reason that the attachment when applied to the old

style drag-rakes produced the Kenaga pattern and developed the advantages which I have heretofore specified for said rake.

Int. 43. You may state whether or not this demand for attachments to convert the old drag-rakes into rakes of the Kenaga pattern still continues.

Ans. It does, and we furnish yearly a great number of them.

Int. 44. State, if you know, the average amount of hay per working day which can be gathered by the Kenaga rake, the usual style of drag-rake, and the push-rake, respectively, assuming that the rakes proper in each instance are of the same width.

Ans. Assuming the same width, the same kind of ground, and the same kind of hay, and hauled equal distance with the same hands and same team—all conditions, in fact, being equal—in my experience the Kenaga rake is enabled to gather up from a third to a half more hay than any of the other rakes.

Int. 45. In the push-rake, such as shown by "Kirk Exhibit C," you have stated that such rake could not work in the corners of the field, and that it was difficult to turn the same right about within a narrow circuit. Please state how the Kenega rake operates in such respects.

61 Ans. The Kenaga rake can be turned right about within the space it occupies on the ground. It can be gotten close up in the corners of the fields.

Int. 46. Please state the comparative cost per working day in operating the Kenaga rake and the drag and push rakes, such as are shown by the "Exhibit Kirk Drag Rake" and "Kirk Exhibit C," respectively.

Ans. In operating the shove-rake, as per Exhibit C, it requires a man; in operating the drag-rake, as per "Exhibit Kirk Drag Rake," it requires two men, or two boys twelve to fifteen years old; in operating the Kenaga rake it would only require one of those two boys. The two boys are usually hired for about the same price as one man. It is therefore shown that the cost of operating the Kenaga rake is but little, if any, more than half the cost of operating either of the other two rakes.

Int. 47. Are you familiar with the general market demand and course of trade in respect to the sales of the types of rakes you have mentioned?

Ans. I am.

Int. 48. How are you so familiar?

Ans. By reason of the position I occupy and by reason of getting out over the country myself.

Int. 49. Is the demand for the Kenaga rake on the increase or the decrease?

Ans. It is very much on the increase.

Int. 50. How is it with the others?

Ans. As far as my observation and knowledge extends it is very much on the decrease.

Int. 51. Do you know the defendants in this cause?

Ans. I do.

Int. 52. Are they manufacturers of the infringing rake?

Ans. Not to my knowledge.

62 Int. 53. For whom are they agents?

Ans. Trumbull, Reynolds and Allen, of Kansas City, Missouri.

Int. 54. Have you ever seen any of the circulars of that company?

Ans. I have.

Int. 55. Will you please produce the same if in your possession?

Ans. Here they are.

Circulars produced by witness are offered in evidence and marked respectively "Kirk Exhibit E" and "Kirk Exhibit D."

Int. 56. Please examine the model heretofore offered in evidence and marked "Complainant's Exhibit Defendants' Rake" and state if you know under whose direction such exhibit was made.

Ans. It was made under my directions by the superintendent of our factory.

Int. 57. How does said exhibit compare in its construction with the full-sized rakes like those sold by the defendants in this cause?

Ans. The whole rake is substantially identical as near as it is practicable to produce in a model.

Int. 58. Were such rakes like said exhibit sold or offered for sale by said defendants prior to the commencement of this suit?

Ans. They were.

Int. 59. Please examine the exhibit model and state, if you know, what relation the brace bar extending from the draft bar forward to the pole or tongue will bear to the top head piece of the rake and the stirrup or staple extending therefrom beneath the brace bar during the operation of backing the rake from its load.

63 Ans. In the operation of backing the brace bar is brought to bear against the under side of the top head piece, but said brace bar is in no way affected by said stirrup.

Int. 60. You may state whether, as your last answer is given, the stirrup is snug up against the brace bar as said bar is made to bear against the top head piece or is below the same.

Ans. No; it is below the same.

By agreement the further taking of testimony is adjourned until Tuesday, April 27, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

TUESDAY, *April 27th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present: J. H. Peirce, Esq., for complainant, and L. L. Bond, Esq., for defendants.

Cross-examination by L. L. BOND, Esq., as follows:

X Int. 61. In your answer to interrogatory 44 you state that, assuming the size of the rake and other conditions to be equal, "the

Kenaga rake is enabled to gather up from a third to a half more hay than any of the other rakes." Did you intend this statement to refer to spring tooth or other rakes of that class or only to the ones previously described by you?

Ans. I intended only to refer to rakes of the class previously described by me.

X Int. 62. If the statement only refers to that class please explain how it is that so much more work can be done with the Kenaga rake?

64 Ans. In using wire or spring tooth rakes the hay is only gathered in windrows and left over the field, requiring manual labor—pitchforks and other means—for gathering and condensing the hay, whereas with the Kenaga rake the hay is taken direct from the swath, gathered and hauled in large quantities into hay-rickers or to the stacks where it could otherwise be pitched.

X Int. 63. It is a somewhat common practice, is it not, to take hay from windrows by these larger carrying rakes like the Kenaga and like ones described by you as having been manufactured prior to your manufacturing the Kenaga rake?

Ans. Yes, sir; such is the case, and the rakes can be used for taking the hay from the swath, and also from the windrows.

X Int. 64. Your comparison, in answer to Int. 44, was instituted with respect to rakes of the size and character of the Kenaga rake, with a horse at each end, but without facility for backing other than turning the horses around. In the use of these older rakes was there any lost time other than that consumed in turning the horses to unload or in getting away from the obstructions mentioned by you?

Ans. In my answer to interrogatory 44 I also mentioned a push-rake in making the comparative statement. There was, in raking with wooden-teeth rakes of the class in question. It often becomes necessary to get the backward motion of the rake while gathering the load, in order that the teeth may drop clear into the ground and run farther under the load being gathered, and thus gather in a much larger load than would otherwise be done by simply drawing the rake until the teeth became first filled and then hauled to the stack.

65 X Int. 65. When you applied the Kenaga attachment to your older rakes, as mentioned by you in your testimony, would the application of this attachment increase the capacity of those older rakes from a third to a half?

Ans. I think they would, and at the same time be much easier operated.

X Int. 66. Please give your understanding of the reason why the Kenaga attachment increased the capacity of those older rakes to such an extent.

Ans. For the reason that, the two horses being controlled and driven by one driver, if a tooth of the rake should run into the ground or become otherwise obstructed the driver simply backs his team to free such tooth and drive forward, which could be done in very much less time than to turn the horses around, traveling a dis-

tance of about twenty feet at each turn, taking up the slack rope to move the rake either backwards or forwards. The single-trees often become unhooked from the tugs while turning the horses, causing the drivers to have to dismount and rehook them, all of which took up time.

X Int. 67. The unhooking of the tugs could be easily remedied by changing the hooks on the whiffletrees or by making them originally so that they would not unhook, could it not?

Ans. This could possibly have been done, but farmers usually use such single-trees to their rakes, as they have on their farms used on cultivators, wagons, and other farm machinery where single-trees are used.

X Int. 68. Is it not a poor rake that runs into the ground very frequently?

Ans. In order to make a rake rake hay clean it is necessary to make the teeth run very close to the ground, and, unless on a very smooth meadow, very often run into the tussocks or branches of grass roots.

66

X Int. 69. Where the teeth are as nearly horizontal as they are in this class of rakes they are not very liable to run into the ground, are they?

Ans. I must say that my experience is that they are very liable to catch in the ground with any form of tooth of that kind I have been able to make, but not to that degree that would materially retard their operation on reasonably smooth meadow.

X Int. 70. The teeth frequently go through the tussocks or grass-root bunches without materially checking the rake, do they not?

Ans. They sometimes do when the tussocks are not tough.

X Int. 71. Do the teeth in the Kenaga rake, as you make it, have any separate or independent vertical movement or vibration at their points?

Ans. We make such teeth of hickory, eight feet long, which will spring and conform to the uneven surface of the ground to a very great extent. We also have a lever device for raising the points of such teeth.

X Int. 72. The spring of the teeth enables the rake to pass over ordinary obstructions in meadows without catching or running into the ground, does it not?

Ans. Where the knolls or tussocks are oval, having a smooth inclined surface, it does to a considerable extent.

X Int. 73. Is the provision for tilting the entire rake one of the advantages considered by you in estimating the superiority of a rake constructed according to the Kenaga patent?

Ans. Not necessarily so.

67

X Int. 74. Does it not require as much time to back out the Kenega rake and turn it around bodily as it does to turn the horses around and pull the rake out backwards when unloading?

Ans. It does not.

X Int. 75. Please explain why the turning of the horses and pull-

ing the rake out backwards is not the quicker method of the two for unloading and getting the rake in position to start back.

Ans. For reasons previously stated and the liability of one driver moving faster than the other in the backward movement often cramps and causes the hay to follow the rake, necessitating the returning of the horses and a forward movement again in order to deposit the load where desired, and especially is this the case when such rakes are used in connection with hay-rickers.

X Int. 76. So far as the binding of the hay upon the rake teeth is concerned, does not the backing of one horse quicker or faster than the other produce the same result?

Ans. Yes; but when the rake is governed by one driver having control of both horses at the same time he is enabled to back the rake squarely out from beneath its load by means of the backing tongues, as described in the Kenaga patent.

X Int. 77. This advantage is due largely to the arrangement of the lines, as stated in your direct testimony, is it not?

Ans. Well, I would say in answer to that that I understand the arrangement of the lines as used on the Kenaga rake to be part of the combination to make up the patent. He certainly could not conveniently manage or back the team without the use of lines.

68 X Int. 78. In the Exhibit D the outer rake, marked "Common Gatherer," illustrates the form of rake used in turning the horses and drawing it back, does it not?

Ans. It illustrates one kind of such rakes.

X Int. 79. It also illustrates what we have called turning the horses around and going backwards into the field, does it not?

Ans. Yes; such rake is so operated.

Redirect examination — J. H. PEIRCE, Esq.:

R. D. Int. 80. In your answer to X interrogatory 66 you state that if the tooth of the rake—in rakes of the Kenaga pattern—should run into the ground or become otherwise obstructed the driver simply backs his team to free such tooth. What is the peculiarity in construction of said rake, if any, which enables him to do this?

Ans. It is the attachment of the horses at each end of the rake—to the tongues.

R. D. Int. 81. Please examine the office copy of the Kenaga patent now shown you and state the part you mean by "tongues."

Ans. It is the part marked C in the patent.

R. D. Int. 82. Is the tongue or pole C there shown employed only for backing the rake from its load or from an obstruction?

Ans. They are also valuable, and I regard them as almost indispensable in the management and guidance of the team.

R. D. Int. 83. Guidance at what time?

Ans. In driving the rake while going to the field—while gathering the load—and also in turning the rake around.

69 R. D. Int. 84. How much, if anything, have the driving lines to do with these movements as compared with the tongues or poles? That is, state the function of each, if any they have.

Ans. The poles or tongues are also guides, each horse being fastened to each tongue. When necessary to turn the rake to the left hold back the horse on the left by means of the driving line, moving up the horse on the right; keep both horses' heads in the same direction until the direction is reached in which it is desired to drive the rake and then go ahead.

R. D. Int. 85. Do you regard yourself as a person skilled in the construction and interpretation of the specifications and claims of patents for inventions?

Ans. I do not.

JOHN E. KIRK.

Subscribed and sworn to before me this 27th day of April, A. D. 1886.

[SEAL.] ALBERT H. ADAMS,
Notary Public.

70 *Notary's Certificate.*

STATE OF ILLINOIS, } ss:
County of Cook, }

I, Albert H. Adams, a notary public in and for the county of Cook, in the said State aforesaid, do hereby certify that the foregoing deposition of John E. Kirk was taken by and before me, at the time and place therein specified, pursuant to agreement; that the parties to the said cause were present at the taking of the same—complainant by its counsel, J. H. Pierce, Esq., and defendants by their counsel, O. W. Bond, Esq., and L. L. Bond, Esq.—as therein appears; that before deposing the said John E. Kirk was by me duly sworn to tell the truth, the whole truth, and nothing but the truth in the cause now pending in the circuit court of the United States for the northern district of Illinois, wherein The Acme Hay Harvester Company is the complainant and Stephen Martin *et al.* are the defendants; that his deposition was reduced to writing from his statements and the same duly subscribed and sworn to by him, as therein appears.

And I do further certify that I am neither attorney nor of counsel for any of the parties in said deposition or caption named, and am in nowise interested in the result of said cause.

In testimony whereof I have hereunto set my hand and affixed my notarial seal this 27th day of April, A. D. 1886.

ALBERT H. ADAMS,
Notary Public.

71 United States Circuit Court, Northern District of Illinois.

ACME HAY HARVESTER COMPANY } In Equity.
vs.
STEPHEN MARTIN *et al.* }

At Chicago, Illinois, on this 24th day of August, A. D. 1886, before Albert H. Adams, a notary public.

Present: J. H. Peirce, Esq., for complainant; L. L. Bond, Esq., for defendants.

At ten o'clock in the forenoon, pursuant to agreement, the parties to the above-entitled cause met at the office of Messrs. Peirce & Fisher, room 66, Honore building, No. 204 Dearborn street, Chicago, Illinois, where the following proceedings were had:

JESSE HUDSON, a witness produced on behalf of the complainant, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by J. H. PEIRCE, Esq., as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. Jesse Hudson; I am 46 years old; I live in Morgan township, Cole county, Illinois; occupation, farmer and justice of the peace.

Int. 2. How long have you been a farmer?

72 Ans. I have been a farmer ever since I was nine or ten years old.

Int. 3. I show you a copy of letters patent No. 94889, dated September 14, 1869, granted to Jesse Hudson, of Charleston, Illinois, for an improvement in horse-rakes, and ask you whether you are the Jesse Hudson named in that patent.

Ans. Yes, sir.

Int. 4. Did you ever make a horse-rake of working size after the plan shown in that patent?

Ans. Yes, sir.

Int. 5. How many did you ever make?

Ans. Only one large one. There were some two or three models for some persons who went West to introduce it. They never returned them and never did anything with them, so far as I know.

Int. 6. So far as you know, was there ever more than the one rake made of working size according to the plans and specifications of your patent before named?

Ans. No, sir.

Int. 7. Do you remember about when it was that such rake was made?

Ans. I don't remember exactly. I think the big rake was made after the patent was granted—probably in 1870.

Int. 8. After that rake was made was it ever used in harvesting hay?

Ans. Yes, sir.

Int. 9. How long was it used?

Ans. We used it part of two seasons.

73 Int. 10. How soon after it was made did you first use it?

Ans. It was made along in the spring; probably in April or May, and it was used during the coming harvest.

Int. 11. When was it last used?

Ans. The harvest following.

Int. 12. Do you remember about how much hay you raked with it?

Ans. I think we raked about thirty acres the two seasons; ten

acres one season and twenty the other. We had a small farm at that time.

Counsel for complainant offers in evidence a hay-rake model, which is marked "Complainant's Exhibit Hudson Model."

Int. 13. Please examine the exhibit model just now introduced and state, if you know, what it is.

Ans. The model is like the one I had, with the exception that the teeth were mortised through the beam in place of being bolted underneath.

Int. 14. What do you mean by saying "like the one I had"?

Ans. I had a model made and also a big rake on the same plan.

Int. 15. Is that the model and big rake concerning which you have already testified?

Ans. Yes, sir.

Counsel for complainant offers in evidence a shortened rake containing the two extreme ends, and the same is marked "Complainant's Exhibit Hudson Rake."

74 Int. 16. Please examine the rake just offered in evidence and state, if you know, what it is.

Ans. As far as it goes it is a model of the old rake, with the exception of the timbers being a little heavier in this exhibit and the teeth were mortised into the axle. The length of the rake was sixteen feet long and the beam into which the teeth were mortised were 4 by 6, as I now recollect.

Int 17. The outer or front upright standards, what were their dimensions?

Ans. Two by four, and had a slot with holes in, the same as this. The back standards were 2 by 4. The rake teeth were between seven and eight feet; they probably lacked a little of being eight feet. The lifting arms or beams were somewhere between eight and ten feet long; I don't remember their exact length. They extended not quite to the end of the teeth, I think.

Int. 18. Aside from the differences in size of the various parts and the manner of securing the teeth as you have mentioned, does the "Exhibit Hudson Rake" fairly represent the working rake constructed by you after the plan of your patent, as you have already testified?

Ans. Yes, sir.

Int. 19. I call your attention to the wheels in the "Exhibit Hudson Rake" and ask where and when, if ever, you have seen them before.

Ans. I have seen them on my farm and used them on my big rake, to the best of my recollection.

Int. 20. What big rake do you refer to?

Ans. The one I have already testified to. I never had but the one large one.

75 Int. 21. You have stated that the big rake built by you after the plan of your patent No. 94889 and of this "Exhibit Hudson Rake" was used by you during parts of two seasons in har-

vesting hay. You may state what became of that rake after the end of the second season in which it was used.

Ans. In the first place, the parties who did the pitching complained of the hay hanging together and made it pitch terribly bad, so when we quit using it we shoved the rake into a hedge, where it lay for years and disappeared gradually, a piece at a time; the wheels were brought up to the house.

Int. 22. Please examine the "Exhibit Hudson Rake" and state if you recognize any parts other than the wheels as belonging to that original rake.

Ans. There is one clevis and those iron axles. I had the wheels and axles afterward in a roller.

Int. 23. What clevis is it that you refer to?

Ans. A little clevis on the outer end of the axle for attaching the chain of the single-tree to.

Int. 24. How does it happen that the wheels and axles and clevis of that original rake are preserved?

Ans. The axles we used for a number of years in a roller, and the wheels were brought to the house; one lay in the barn and the other under the steps of the wash-house. The clevis was thrown into a box of old irons and happened to be there when looked for. There were two in the first place, but only one was found.

Int. 25. In using the original rake like that shown in your patent No. 94889 you may state what was the purpose of the arms or bars C extending forward at the sides of the rake.

76 Ans. They were calculated for hand levers to adjust the teeth, in case they should strike a little tussock or anything of the kind, to be operated by the rider—that is, by the person on horseback.

Int. 26. You may state how the hand levers C worked in practice—whether successful or not.

Ans. Well, I think not when we run into anything tight. A man on a horse couldn't raise it out of a trussock. A man on horseback didn't have the power he would have on the ground. With a heavy load on we would have to turn around and back out.

Int. 27. Did it ever occur to you that instead of turning the horse around and backing out the horse might be hitched at the front, to the arm C, and that arm be used as a pole to aid in backing the rake?

Ans. No, sir; I never thought about a thing of that kind; and it didn't extend far enough out. It generally come near the collars.

Int. 28. In the rake, then, as constructed by you the arms C could not be used to back the rake. Is that true?

Question objected to as leading.

Ans. Yes, sir.

Int. 29. You have stated that the clevis on the outer end of the axle, as shown in the "Exhibit Hudson Rake," was used for attaching the chain of the single-tree. Do you remember about how long those chains were?

Ans. I don't know exactly the length. I think we used the stay-chains of a wagon.

Int. 30. About how long are the ordinary stay-chains of a wagon?

77 Ans. I would think they were between sixteen inches and two feet. Some stay-chains are longer than others.

Int. 31. Did you use the full length of such chain?

Ans. I don't remember positively, but I think I did. That was fifteen or sixteen years ago when that was done.

Int. 32. How was the single-tree attached to the chain?

Ans. I don't remember whether it was by a hook or a link. It was fastened so it would draw.

Int. 33. Do you remember about how far front of the wheel the single-tree came when the horse was drawing?

Ans. No, sir; not exactly; it was far enough so that the wheel and single-tree would not interfere with each other—some few inches, I suppose.

Int. 34. You may state whether, in the use of the old rake, any breaking of its parts occurred; and, if so, what they were.

Ans. I think we split one of those uprights (pointing to one of the front standards).

Int. 35. You may state how that happened.

Ans. In pulling outwards like on the lever marked C in the drawing of the patent.

Int. 36. When the rake was heavily loaded, if you chanced to strike an obstruction, did you usually employ the lever marked C in the drawing to clear the obstruction?

Ans. We generally turned and pulled her out backwards if we couldn't pull forwards.

78 Int. 37. Why, then, did you not use the levers C under such condition to lift the rake clear of the obstruction?

Ans. Too heavy, for one thing. The load on the rake would make it more than we could lift.

Cross-examination by L. L. Bond, Esq.:

X Int. 38. So far as the gathering of the hay is concerned the rake worked well, did it not?

Ans. Yes, sir; till it got its load.

X Int. 39. Did you use it to make windrows?

Ans. No, sir.

X Int. 40. Where did you deliver the hay?

Ans. We delivered to the stack or rick, whichever we were making.

X Int. 41. After the load was done it was pitched up by hand, was it not?

Ans. Yes, sir; pitched up with pitchforks.

X Int. 42. If the rake had been narrower or had a less distance between wheels the pitchers would have made less objection to the tangling of the hay, would they not?

Ans. There would have been a smaller bunch, of course.

X Int. 43. All horse-rakes tangle the hay so as to make pitching more difficult, do they not?

Ans. I think they do; even a sulky-rake will do that.

X Int. 44. What kind of a rake did you use after you quit using the rake like the model "Exhibit Hudson Model"?

Ans. I bought a revolving rake eight or ten feet long, which I have used up to this last harvest.

79 X Int. 45. What kind of a rake did you use for this last harvest?

Ans. I used a sulky spring-tooth rake. I raked about eighty or ninety acres with it.

X Int. 46. If you had placed bent irons like those shown in Kenaga patent No. 259,550 on the outer ends of the poles C of your big rake you could have attached the horses to them by breast straps or chains, could you not?

Ans. No, sir; they would not have been long enough.

X Int. 47. That would have been the only difficulty, would it not?

Ans. That is the only difficulty I know of. The pole must extend forward of the horse when he is pulling.

X Int. 48. Had you seen any of these wide or sweep rakes, as they are now called, before you made your machine or the model made for the Patent Office?

Ans. I saw a pole; I guess it was fifteen or sixteen feet long; it had no wheels. This was the only long rake I had ever seen.

X Int. 49. If the whiffletrees had been attached to a cross-bar behind the wheels, then the poles C would have been long enough for hitching the breast straps of the horses to them, would they not?

Ans. If they had been put back far enough they would have been long enough, but they wouldn't work, because the strain would be sideways and would burst the forward uprights.

JESSE HUDSON.

80 JOHN E. KIRK, a witness produced on behalf of the complainant, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by J. H. PEIRCE, Esq., as follows:

Int. 1. Are you the same John E. Kirk who has already testified for the complainant in this case?

Ans. I am.

Int. 2. Please examine the Complainant's Exhibit Hudson Model and state, if you know, what it is.

Ans. It is a model made in exact accordance with the specification and drawings of the Jesse Hudson patent No. 94889, patented September 14, 1869.

Int. 3. Under whose direction was that model made?

Ans. Under my direction.

Int. 4. Please examine the "Complainant's Exhibit Hudson Rake" and state, if you know, what it is.

Ans. It is a rake reduced to narrow width containing the two extreme ends of a rake constructed in exact accordance with the draw-

ings and specifications of the Jesse Hudson patent which I have heretofore mentioned as near as it was possible for a skilled mechanic from measurements obtained from copies of the drawings of the Hudson patent to produce.

Int. 5. You state that the exhibit has been "reduced to narrow width." What do you mean by that?

Ans. I mean that we have left out eight teeth and brought the two ends nearer together by using short head beam and bringing the two ends with the bars marked C in the Hudson drawing and the front and back uprights and the two long end teeth nearer
81 together for convenience in shipping and for the purpose of exhibiting the parts in question conveniently in court.

Int. 6. How wide across was the rake which has thus been reduced in width, as you have described?

Ans. Sixteen feet between the wheels.

Int. 7. Are the wheels of the exhibit in the same relation now to the long rake teeth next thereto as in the full-sized rake before it was reduced?

Ans. They are.

Int. 8. You may state how, if at all, aside from the reduction in width you have mentioned, the exhibit rake differs from the full-size rake which you made.

Ans. It does not differ at all. They are the same bars C, front and back slotted posts, long teeth, axles, and wheels as used in the construction and operation of the full-size rake which I made in accordance with the Hudson patent.

Int. 9. I call your attention to the wheels, axles, and clevis of this Exhibit Hudson Rake and ask you to state how they came into your possession and why they were used in the construction of the full-sized rake you had made.

Ans. As the Jesse Hudson patent No. 94889 was claimed by the defendants in this case to have anticipated our Kenaga rake, I visited Mr. Jesse Hudson at his farm, about nine miles northeast of Charleston, Coles county, Illinois, to obtain from him, if possible, one of his original rakes, and was only able to obtain the wheels, axle, and one clevis which he stated were used in the construction and operation of his original and only rake made in accord-
82 ance with his patent, and, being directed by you (referring to Mr. Peirce) to make such a rake, I used said wheels, axles, and clevis in part construction of the rake, using new material for the remainder.

Int. 10. You may state whether the full-size Hudson rake made by you was constructed in good, substantial, and workmanlike manner for field purposes, the same as if it were a rake of your company's regular manufacture.

Ans. It was. We did not take the pains to round up the corners and paint and stripe it as we do our regular stock is the only difference.

Int. 11. What do you understand by the full-sized rake to which the questions have referred?

Ans. I have reference to a full-sized rake made by me in accord-

ance with the Hudson patent specifications and drawings, and afterwards I reduced it to the width of the Exhibit Hudson Rake, which is here as an exhibit.

Int. 12. Please examine the Exhibit Hudson Model and state how, if at all, such model, aside from difference in size, differs from the full-sized rake which was made by you after the Hudson patent. I refer more particularly to the structure, organization of the parts, and their relative dimensions, as shown in said model exhibit.

Ans. The model which you hand me is substantially the same in construction as the full-size Hudson rake which I made. The relative dimensions of the parts are the same. The model is reduced on a scale of an inch to a foot.

83 Int. 13. What was done with the full-size Hudson rake like the exhibit model after such rake was made by you?

Ans. We took it to a meadow, where we hitched horses to it and operated it, as described and set forth in Hudson's patent.

Int. 14. You may state in detail the course of your operations with the full-sized rake as conducted by you in the meadow.

Ans. I hitched a horse at each end of the rake and had a couple of men ride the horses and gather a load of hay on the teeth, but, being hitched at the ends of the draft chains, I had to drive very slow and careful to prevent the horses from being hurt with the points of the teeth, as the points of the teeth were about half way between the fore feet and hind feet of the horses. If one horse should move up a little faster than the horse on the opposite end the result would be to pull the teeth around and under the horse. When the rake was loaded the men on the horses attempted to raise the points of the teeth to help them over an obstruction, which was impossible for them to do. Sitting astraddle of the horses, they were in no position to raise or lift much of a load. When we first commenced to use the rake we had short draft chains only allowing room enough for the wheel to turn clear of the single-tree. When we turned the horses around to withdraw the rake from its load and go out for another load we found these chains too short to admit of the single-tree working clear of the back upright post, and also the end

84 of the long backward-extending rake tooth would strike the horse's heels and prevent him from traveling. We thus had to extend the chains, and when drawing the rake forward with the chains extended, as I have described as being necessary for the backward drawing of the rake, brought the horse's fore feet still farther forward and put the horse in a position still more liable to be injured by the rake teeth in the manner I have heretofore mentioned. When empty the rake was very easily tilted, throwing up the points of the teeth by means of the levers (marked C in the drawing). We operated with this rake in this way for some little time, when the riders got off the horses and we attached backing chains to the ends of the bars C and hitched the horses thereto by the breast straps, as shown in the Acme Lithograph Exhibit, and arranging the lines and hitch strap as shown in said lithograph, when I got behind the rake and attempted to drive the two horses myself, but which I found was impossible and impractical and dangerous to the horses for me

to attempt to do. The horses, too, were horses that had been worked to one of our Acme rakes for the whole season raking a large meadow and were well trained to work and be driven singly in this way, as shown in the Acme Lithograph Exhibit. The first trouble that I encountered in attempting to draw the rake in this way was that the pull would come first on the breast strap and backing chain before the single-tree could be raised from the ground or any draft come upon the tugs. I first discovered, however, when standing the horse in position to be hitched to these bars C, as I have mentioned,
85 that there was not space enough between the single-tree and the end of the backing chains upon the end of the bar C to allow the horse's hind feet to come as far forward as the single-tree, as the single-tree was about half way between his fore feet and hind feet. Thus hitched they were in no position to draw the rake forward by means of the tugs and draft chains, and it was impossible to have them draw the rake forward any distance. So hitched I attempted to turn the rake by holding one horse back and moving up the other. This I found I could not do without injury to the pivot horse, as the bars C were shorter than the teeth and some four feet above and on a parallel with the outside teeth. The teeth struck the feet of the pivot horse before the bar C did his side, and came very near throwing the horse on his side onto the rake. The bars C of the said rake having no lateral support, they sprung inward and the outside teeth were stiff. I then attempted to make the horses back the rake, but, as I have heretofore stated, the distance being so short between the single-tree and the backing chain, they with some difficulty backed out over the single-tree and out of their tugs until sufficient distance for the strain to come upon the backing chain, when, by reason of the height of the backward end of the bar C above the pivot or axle of the rake, the effect was to raise up the points of the teeth and throw the rear ends of the long two outside or backward-extended teeth onto the ground and prevent the rake being backed at all. In thus attempting to back the rake I broke one of the front and one of the back upright supporting bars
86 for the arms C, as in the construction of said rake there is no provision made for any lateral or side strain upon the said bars C or upright slotted posts, and, while they were made of good tough white oak, they broke. In fact I found it impossible to either drive the horses forward or back them, hitched to the Hudson rake, as I have stated, as the bars C of the Hudson rake, as I have before stated, are directly parallel and above the two extreme end teeth of the rake, and they serve no purpose as guides or leads for the horses, as in the Kenaga patent and Acme Lithograph Exhibit. No one person, either mounted on the centre of the rake or walking behind it, could drive to horses so attached to the Hudson rake to operate the same, even if the bars C were made long enough to extend forward far enough to admit a horse being hitched so that the draft would come first on the tugs and draft chains, for reasons which I have stated that the bars C being directly above and parallel with the two end or outside teeth, they serve as no leads or guides, absolutely necessary where two horses are attached to a rake and driven

by one driver in the way shown and described in the Kenaga patent. By the Kenaga device the horses are always kept in exactly the same position with relation to each other and the rake, with their heads always in the same direction, as one horse cannot change position without the other. It is also an important fact that cross-checks, such as are used in hitching two horses side by side to a wagon, mower, or other vehicle, cannot be used in this kind of a rake, for the reason that such cross-checks would interfere with the ricker fingers in drawing on a load of hay, or the stack when used in gathering and hauling hay thereto, to be pitched by
87 hand. In short, I think that the tongues and devices as arranged by Kenaga for guiding and backing the rake and keeping the horses entirely free from being hurt by the teeth of the rake and dispensing with the necessity of two operators and enabling one boy to easily, practically, and successfully manage and operate a rake of this kind with such ease to the animals and satisfaction to the farmers—that it is the greatest improvement ever made on rakes of this class, and to this invention—Kenaga's—is solely due the successful use and popularity of this kind of a rake throughout the entire hay-producing section of this and foreign countries.

Int. 15. During the operations by you in the field with the full-sized Hudson rake you will state how the draft chains carrying the single-trees were attached to the rake.

Ans. They were attached in the reversible clevis, as shown in the "Complainant's Exhibit Hudson Rake," at the end of the axle.

Int. 16. You state that when the Hudson rake was loaded the men, riding astride the horses, attempted to raise the points of the teeth to help them over an obstruction. In what position relative to the rake were the horses at this time?

Ans. They were at the sides of the rake teeth and bars C and in front of the wheels.

Int. 17. In what manner did the men attempt to raise the points of the teeth?

Ans. Directly upward and by means of the bars or handles C.

Int. 18. Why was it impossible for them to raise the teeth in such wise?

88 Ans. Because it would pull the horse over as well as the rider in the direction of the rake.

Int. 19. Were there any saddles on the horses?

Ans. There were.

Int. 20. Were there any stirrups to the saddles for the men's use?

Ans. There were.

Int. 21. Is it usual to have such saddles and stirrups in working a rake with horses at the sides, having separate riders thereon?

Ans. No; it is not general, though it is sometimes the case where men or very large boys ride the horses. It is an objection, however, to have the saddles on the horses, as it heats them and more or less interferes with the harness and chafes the horses.

Int. 22. You state that the horses used by you in trying this Hudson rake were "horses that had been worked to one of our

Acme rakes for a whole season." What do you mean by "our Acme rake"?

Ans. I mean such a rake as the Acme Hay Harvester Company manufacture and such as shown in the Acme Lithograph Exhibit and made after the specifications of the Kenaga patent.

Counsel for complainant offers in evidence a rake model, which is marked "Complainant's Exhibit Acme Rake Model."

Counsel for defendants objects to the introduction of this or any models representing the complainant's patent or rake at this stage of the case, for the reasons, 1st, that it is not in rebuttal, and,
89 2nd, that putting it in now prevents the defendants from showing its inaccuracies.

Int. 23. Please examine the Exhibit Acme Rake Model and state how, if at all, the draft bars with the single-trees and the projecting poles at the sides of the rake, in their relations to the rake head and rake teeth, as in said exhibit, differed in such relations from the draft bars and poles, if such were used in the Acme rake to which the horses had been worked prior to the test of the Hudson rake.

Objected to for the reason that the rake heretofore known in this record as the "Acme rake" is the rake shown in the Exhibit Acme Lithograph, which is a radically different rake from the model, and it is therefore improper and incompetent to change names at this stage of the proceedings.

Ans. Such draft bars and poles were used on the Acme rake which I have heretofore mentioned and sustained the same relation to the ends of the rake head, rake teeth, and the horses, and used for the same purpose of guiding, driving, backing, and managing the rake and teeth.

Int. 24. About what was the length of the backing chains which were attached to the ends of the levers or arms C of the Hudson rake, for hitching the horses to—forward—as you have detailed?

Ans. The chains were about eighteen inches long.

Int. 25. You may state whether the chains made a loose or a tight hitch for the horses.

Ans. They made a loose hitch. It was about as close a
90 hitch as you could make and give room between the front of the horse and the bar C. It would require a chain of this length to attach a horse and give him room to stand and walk by the side of the bar C.

Int. 26. You say that the hand levers or bars of the Hudson rake (marked C in the Hudson patent) are directly parallel and above the two extreme end teeth of the rake and serve no purpose as guides or leads for the horses as in the Kenaga patent. Examine the drawing of the Kenaga patent and specify what part there shown is intended to serve as a guide or lead.

Objected to as not being in rebuttal.

Ans. The projecting poles C C, as shown in the Kenaga patent,

serve as leads or guides for the horses, as well as backing the rake from beneath its load; as the poles in the Kenaga patent extend upward and outward from the teeth they serve as guides and guards to keep the horses off the teeth, and also bring the forward end of the bar C to a point directly in front of the center of the single-tree on the draft bar, which allows the horse to directly draw the rake forward or back it directly backward, and all the time be on a parallel with the teeth of the rake.

Answer objected to as not being in rebuttal.

Int. 27. Suppose the side bars marked C in the Hudson drawing were lengthened sufficiently to allow the horses to be hitched thereto and draw upon the tugs and single-tree, and that the rakes were about sixteen feet across the teeth, as in the full-sized Hudson rake made and tested by you, and that the horses were furnished with cross-hitches or check-lines running from the bits and con-
91 trolled by lines in the hands of a single driver located on or back of the rake. You may state whether such a rake so organized could be used practically in the ordinary operations of raking hay and bringing it to a stack or loader, and in backing and wheeling therefrom, giving your reasons for any opinions you may express.

Objected to for the reason that the witness has already gone over this entire ground in answer to interrogatory 14.

Ans. It could not be so operated for reasons which I have heretofore stated, and others that I will mention—for the reason that the bars run parallel and directly above the teeth, and can serve as no guards to keep the horses off the teeth, and, having no braces laterally, the bars or posts would break off when a slight strain should come upon them, and, owing to the bearing of the bars C upon the upright post, the effect is to raise the points of the teeth and tip the rake backward and bring the rearward ends of the long teeth against the ground to prevent the rake being backed; also, the rake could not be driven onto a ricker or up to the end of a rick or stack to deposit the load, for the reason that the cross-checks would first strike against the pitcher fingers of rickers or against the ends of the rick, and not allow the load to be drawn and deposited where desired; also, in straddling and hauling in windrows of hay (which is often done with this kind of a rake) the cross-checks would come against the hay and stop the team, and, furthermore, long sixteen-foot swinging checks would be very heavy on the sides of the horses' mouths, which would pull them inward and onto the teeth, and I don't think that it would be at all possible to operate a
92 rake of this kind with horses attached and arranged in the way you have mentioned.

Int. 28. You may state whether or not cross-hitches or check-lines running from the bits of the horses and controlled by lines leading to the driver were the usual devices at the date of the Kenaga patent for managing a team of horses hitched side by side to a vehicle.

Ans. They were the usual devices and are yet—the only devices here two horses are driven by one driver.

Int. 29. Would not the same objections as to the use of cross-hitch check-lines in operating the Hudson rake, as mentioned by you answer to question 27, also apply to the Kenaga rake as described his patent?

Ans. It would to a certain extent. The draft bars in the Kenaga rake, being back of the head of the rake, put the horses that much farther back than they would be hitched to the Hudson rake, with chains long enough to allow the single-tree to work in front of the wheels, but as to the objections stated, of the cross-checks interfering with the hay and the pitcher fingers, it would be about the same in both cases.

Int. 30. Are such cross-hitches described in the Kenaga patent, or are such employed as necessary to the working of a rake made in accordance with said patent; and, if not, why not?

Ans. They are not described in the Kenaga patent; neither are they necessary, but in said patent Kenaga specifically states how the horses are to be attached, each independently of the other, at the ends of the rake, and, the horses being attached to the forward end of the upwardly and outwardly projecting poles C C of the patent,
93 they form leads which when holding one horse and moving the other that the horse moving, when turning, leads himself around, and when the desired direction is reached, by making both horses move together, the rake can be driven where desired, as in operating the Kenaga rake, as stated and described in his patent, the horses are not directed and guided by the lines, as in operating other vehicles with cross-checks and lines or double lines, where it is necessary to watch the movement of the horses, but from the position of the driver at the center of the rake he has only to watch the movements of the rake teeth and move up one horse or hold back the other to obtain the direction desired to be traveled with the rake, and does not have to watch or guide his horses separately.

By agreement of counsel the further taking of testimony is adjourned until Wednesday, August 25th, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

WEDNESDAY, *August 25th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

Int. 31. In operating the full-sized Hudson rake you may state what the distance was between the hitching end of the backing chains as the same were extended in the act of backing and a point in the lifting arms (marked C in the drawing) perpendicularly above the position of the single-tree.

94 Ans. Two feet and ten inches was the distance, which only allowed sufficient room for the wheel to turn and not

interfere with the single-tree. It allowed the single-tree to come far enough in front of the wheel so as not to prevent the wheel turning.

Int. 32. You may state about how long the lifting arms C were, measuring forward, from their point of attachment to the front upright standards.

Ans. From the point of attaching the backing chain to the bar C is just five feet; to the extreme end of the pole two inches longer.

Int. 33. You may state what the average distance is between the front and back feet of a horse of ordinary size.

Ans. About five feet and six inches.

Int. 33*a*. Please examine the exhibit drawing just introduced in connection with the specification of the Hudson patent already in evidence and state what, if anything, determined with you the length to be given to the lifting arms C as compared with the rake teeth.

Ans. I took as a basis of measurement the statement in the specification that the rake teeth, except the two outside ones, were eight feet long, which outside ones are stated to be longer. From the measurement or scale thus obtained our superintendent and draftsman were enabled to accurately ascertain the exact length of the various parts of the rake. I also noticed that the original drawing of the Hudson patent showed that the bars C of Fig. 1 of the drawing did not extend as far forward as the points of the teeth by about twelve inches, as indicated by the cross-line in said drawing.

95 Counsel for complainant offers in evidence a certified copy of the original drawing forming part of the Hudson letters patent No. 94889, and the same is marked "Complainant's Exhibit, Hudson Original Drawing."

Int. 34. In the operation of backing a rake made in accordance with the Kenaga patent, and having the stiff poles secured rigidly to the rake head instead of being flexibly joined thereto, as in the Exhibit Defendants' Rake, you may state what, if any, difficulty is experienced in making the teeth of the rake to clear their load, and what, if any, difficulty the horses encounter from the poles to which they are hitched.

Ans. There is no difficulty experienced in backing the rake from beneath its load, as shown in the Kenaga device. The horses encounter no difficulty from the poles, for the reason that the horses are out and from the poles some distance and only connected to the poles loosely by a chain or breast strap, which allows the end of the tongue to vibrate up or down in a vertical direction two feet or more and not interfere with the horses' necks.

Int. 35. With the rake built after the plan of the Kenaga patent state what, if any, difficulty is experienced in proceeding to the field when the rake is emptied at a smart pace.

Ans. There is no difficulty, for the reason that the driver's seat is located on the rake in position to allow the teeth to come onto the ground, but only lightly, and the teeth of the rake, being large and turned up at the points, will pass over ordinary obstructions in the field without catching, even when heavily loaded. When empty it

would be almost impossible for the teeth to run into the ground.

96 Int. 36. What advantage, if any, do the teeth possess in returning to the field and resting lightly upon the ground?

Ans. They possess the advantage of gathering any loose hay that may have been left on the meadow, and a rake without any device for lifting the teeth is preferred by many farmers for this reason.

Int. 37. Look at the Defendants' Exhibit Hudson Patent and, assuming the horses to be hitched at their forward ends to the lifting poles marked C, and at the back by single-trees swivelled to extensions of the wheel axles, like the axles of Defendants' Exhibit Bean Patent, state whether the horses thus hitched could be operated in the manner and for the purposes described in the Kenaga patent for loading, turning, and backing, giving your reasons for any conclusion you may reach.

Ans. The rake with horses so hitched could not be operated, for the reason that there is scarcely room enough for the horses to stand between the end of the bars C and the axles of the rake, and there would not be room enough for the horses to take a single step in either direction so hitched and move the rake forward by means of the tugs or backward by means of the backing chains, as there is only a distance of three feet and ten inches between the ends of the backing chains and a point perpendicular above the center of the axles or where you have mentioned attaching the single-tree, and the shortest space which it would be possible to hitch and practically operate a rake with horses so attached would be eight feet and six inches. Another serious objection with horses attached to the Hudson rake as you have de-

97 scribed, with the axles extended far enough through the wheels to admit of a single-tree being attached, would bring the horse's hinder parts farther out and from the end of the rake and line of draft than his forward parts would be. The horses thus hitched would be in a very awkward position to travel forward, and in backing would be in position to more easily break off the bars C or the back or front upright slotted posts that support the said bars, and would also put the horses in such position that the driver, from his position on or back of the center of the rake, could not guide or manage the team.

Int. 38. What risk, if any, would the horses encounter in backing by reason of the extended position of the axles to which the single-trees are assumed to be swivelled?

Ans. They would strike their hind feet against this extension and throw them backwards four or five feet before any pull would come on the backing chains. It would be very liable to cripple the horses.

Int. 39. Look at the "Exhibit Hudson Rake," which was made and tested by you, and, assuming that iron hooks like those shown at *c* in the Kenega patent were attached to the forward ends of the lifting bars of the Hudson device and horses hitched thereto at the front and by single-trees at the back, secured either to the clevis chains or to extensions of the Hudson axle, state whether it would be practicable to use such Hudson rake in the manner and for the purposes of the rake described in the Kenaga patent.

Ans. It would not be practicable to so use the Hudson rake,
98 for the reasons stated in my last answer, as the extended iron hook *c* would only provide a hitch about twelve or fourteen inches further forward than the chain and not allowing distance enough by about three feet for the horses to work, and, with the attachment of the iron hook *e*, the horses would strike their breasts against it and prevent them moving the rake forward by means of the draft tugs at all.

Int. 40. Assuming that the lifting bars or arms of the Hudson device extended five feet forward from the front of the wheels, and that the horses were hitched by breast straps at the front to the front end of such bars and at the back by single-trees to the rake axles or clevis chains, would it be practicable to operate such rake in the manner and for the purposes described in the Kenaga patent?

Ans. It certainly would be impossible to so operate the rake or move the same three feet in either direction—backward or forward—and thus could not be for the purposes and in the manner described in the Kenaga patent, for reasons which I have heretofore stated.

Int. 41. Suppose the single-trees were held off the horses' heels by the use of hip straps or the like, such as are used for plowing, etc., and the conditions as to hitching were as stated in Int. 40, could the Hudson machine then be used in the manner described in the Kenaga patent?

Ans. It could not, for the reason that if horses were hitched at the end of a draft chain permitting the single-tree to come in front of the wheel with supporting hip straps, as you have mentioned, on the horses would prevent the single-tree from dropping onto
99 the ground to permit him to back out over the same, and thus prevent the backward movement of the rake by the breast straps pulling on the end of the bars C, as his hind legs would strike the single-tree first. With the single-trees attached on the outward-extending axles from the centre of the wheels in the Hudson rake hip straps would serve no purpose, as the line of draft from the hame tug would come on a direct line with the single-tree, and as the single-tree would be supported by the axle hip straps would be of no purpose.

Int. 42. In the operation of backing the rake state what, if any, difference would exist were the horses hitched to bars C, mounted on upright standards, as in the Hudson patent, and poles C, mounted on the rake head, as in the Kenaga patent.

Ans. In the operation of backing the Hudson rake, owing to the rear ends of the bars C being connected to upright standards about three feet and three inches above the centre or axle of the rake, to provide a leverage, as stated and claimed by Hudson in his patent, when backing the rake the effect was to tip the rake and bring the rearwardly extended teeth of the rake against the ground and prevent backing the rake at all. This was the result when the rake was empty or only partly loaded. When loaded I broke one of the back upright standards before I could back the rake half the distance necessary to unload the same.

In the Kenaga device the rear ends of the backing poles C are

down on the rake head, and as near as possible to the centre of the rake axle, thus making the line of draft in backing the rake
100 almost on a center with the wheels, which prevents the teeth from tipping up and causing the objection which I have mentioned in the Hudson rake.

Int. 43. Regard being had to the purposes of the poles C, as described in the Kenaga patent, state whether or not a skilled mechanic having such purposes in view would locate the Kenaga poles in the manner you have stated.

Ans. I think he would.

Int. 43*a*. Would he have done so at the date of the Kenaga patent?

Ans. I don't think he would without experimenting and exercising more or less invention.

Int. 44. At the date of such patent, and with the specifications thereof before him, would such mechanic have arranged the poles C in the manner shown by the arms C of the Hudson patent?

Ans. I think he would not have so arranged them.

Int. 45. Why not?

Ans. For the reason that the specification of the Kenaga patent describes that the backing poles C should extend upward and outward from the rake head, and that they should be stiff to form leads or guides for the horses, and the bars C arranged as in the Hudson rake, as I have heretofore stated, serve no purpose as leads or guides or for the purpose of backing.

Int. 46. At the date of the Kenaga patent, and with the specifications thereof before the skilled mechanic, would he, in constructing such device, arrange the poles C by extending the same rigidly forward from rear uprights, such as are the rear uprights supporting the arms C of the Hudson patent?

101 Ans. I think, if I understand the question, he would not, but would connect the rear part of such backing poles to or near the head of the rake.

Int. 47. Why would he do this?

Ans. In order to get the back end of the pole C as near the center of the wheel as possible, in order to back the rake without tipping it over in a backward direction and prevent raising the points of the teeth from the ground.

Int. 48. At the date of the Kenaga patent, and with the specifications thereof before the skilled mechanic, would he, in the practice of the Kenaga invention, construct a pole, C, so as to rigidly extend the same from the upper ends of standards located above the axle, such as are the front standards shown in the Hudson patent for supporting the lifting arms C of said patent.

Ans. I think he would not.

Int. 49. Why not?

Ans. For the reason that he could very readily see that the rake would tip over in attempting to back it.

Int. 50. Considering the several functions which the pole C of the Kenaga patent have to perform, state how, in your judgment, the skilled mechanic, at the date of said Kenaga patent, would locate

such poles in the construction of a Kenaga rake with the specifications of said Kenaga patent before him for his guidance?

Ans. As the form of the rake head, as shown in the drawing of the Kenaga patent, was well known at that date, the lower parts of the rake head being composed of two parts parallel with each other and about sixteen inches apart, with truss blocks at the ex-
102 treme ends and above the two end teeth and one block in the center resting on the center tooth, and on top of these blocks, which were about twelve inches high, was another cross-piece through which long bolts passed through the rake blocks and through the lower head pieces and the rake teeth, thus forming a rake head, I think that with the drawings of the Kenaga rake before him and the specifications that the pole should extend upward and outward to a distance sufficient to admit a horse being hitched thereto for backing, and that he would connect the rear ends of the poles C to the back, just on top of the back head piece of the rake, bevelling the under part to admit it resting on a flat surface, and bolt the same to the under side of the front top head piece of the rake, which I have described, which would give the proper elevation to the front ends of the poles to admit a horse being hitched thereto by a breast strap.

Int. 51. Could he not have obtained the same elevation of the poles C at the front by attaching the rear ends of the poles to upright standards extending above the rake head, like the front standards of the Hudson patent; and, if yea, would he not have done this?

Ans. He could have obtained the proper elevation of the front end, but could not have backed the rake with the rear parts of the poles so attached for reasons which I have heretofore stated.

Int. 52. What object of the Kenaga invention is accomplished then by securing the poles C at their rear ends, well down on the rake head rather than above the same, on upright extensions?

103. Ans. To enable the rake to be backed directly out from beneath its load without tipping it backwards, as the line of draft with the rear ends of the poles at this position, relative to the center of the wheels, the rake is not tipped backwards when the draft of the animal is brought to bear on the backing pole.

Int. 53. If the skilled mechanic having regard to the purposes of the Kenaga invention and with the specifications of the Kenaga patent before him at the date thereof would have located the rear ends of the poles with respect to the rake head in the manner you have detailed, how do you reconcile your statement in this respect with your answer to Int. 43*a*?

Ans. In answer to this I will have to state that I did not understand the question 43*a*. My understanding of that question was would a skilled mechanic, after having made known to him the advantages and need of some device of attaching horses at the end of rakes of this kind by means of poles or head tongues, would have produced the same or similar construction as shown in the Kenaga patent without the exercise of invention.

Int. 54. You may now state whether, at the date of the Kenaga

patent, the skilled mechanic, without knowledge of the improvement described in said patent, could or would have produced the same, operating in the manner and for the purposes described in said patent, without the exercise of invention?

Ans. I don't think he would without the exercise of great invention and don't wish to be so understood. I don't think any one could have produced such results as shown in the Kenaga patent without the exercise of great invention.

104 Int. 55. Is there any described thing in the Hudson patent which, in your judgment, would have enabled the skilled mechanic to have produced a rake like that set forth in the Kenaga patent without the exercise of invention?

Ans. I don't think there is.

Int. 56. Examine the Exhibit Defendants' Rake and state what, if any, difference results in guiding, driving forward, or backing the rake by reason of the flexible connection of the hitching poles to the rake head over the same poles if rigidly attached to such heads, as described in the Kenaga patent.

Ans. There is no difference and the same result is obtained for each of the purposes you have mentioned as that shown and described in the Kenaga patent.

Int. 57. You may state whether in the use of defendants' machines, like that shown by the Exhibit Defendants' Rake, the horses are hitched at their front to the front ends of the projecting poles.

Ans. They are so hitched.

Int. 58. State what purpose, if any, the poles thus hitched perform in the operation of wheeling or turning rakes like that of defendant.

Ans. They form leads to lead the horses in the desired direction, and also as guards to prevent the horses from getting on the rake teeth, and for various other purposes, which I have previously mentioned in my testimony.

Int. 59. Please examine Defendants' Exhibit King Patent and state whether, if thills or poles were attached to the vertical

105 and laterally swinging frames at the sides of the rake there shown and horses were hitched to the thills or poles, to be managed by a single driver, such rake could be backed, turned, or driven in discharging and collecting hay.

Ans. It could not be so used for the reason that as the tongues or poles would not be stiff laterally, they would serve no guide in keeping both horses in the same position relative to the rake and parallel with each other, as one person could not manage and guide two horses independently attached to a rake in this way.

Int. 60. Why would not the tongues or poles be stiff laterally?

Ans. For the reason that I understand these swinging frames at the ends of the King rake, as shown in the patent, to be hung on a pivot so as to swing freely laterally in either direction.

Int. 61. I show you Defendants' Exhibit Currier Patent, which is for a corn-harvester, and ask you to state, if you know, about how far apart the horses would be located when hitched to the poles marked G in said patent.

Ans. They would be about four feet apart; necessarily so to straddle a row of corn, each horse walking in the center between rows, which is about the ordinary distance between corn rows.

Int. 62. What expedient, if any, would be adopted with horses thus hitched and located to manage the same under the control of a single driver?

Objected to as immaterial.

106 Ans. They would be hitched as ordinarily hitched to a farm wagon or wide-cut mowing machine, using check-lines crossing between the horses as though there were only one tongue. The object of the two tongues, as shown in the corn-harvester, and the absence of a center tongue and double-trees, is to allow the standing corn to come in proper position to be gathered by the harvester.

Int. 63. Suppose the separate tongues shown in the Currier patent, located as these are in the front of the machine, were arranged in the same fashion and at the distance apart you have mentioned, on a rake of the Kenaga pattern, could the horses be hitched thereto and rake be used in bringing hay to a stack or loader, as described in the Kenaga patent?

Ans. They could not.

Int. 64. Why?

Ans. For various reasons; the distances between the tongues would not be sufficient distance for a rake, and if hitched, as you state, directly in front of a rake of the Kanega pattern the tongues must necessarily be made long enough to allow the horses to walk entirely in front of the rake teeth, which would prevent the rake with a load from being drawn up to a rick or stack of hay or onto a hay-ricker, and would also prevent the backing of the rake to discharge its load, as the load would be gathered between the head of the rake and the horses' feet, and it would be impossible to back the horses so attached backwards over the pile of hay.

Int. 65. The defendants' expert, Mr. Bates, has testified that, so far as concerns the operation of turning a rake like that of the Kenaga patent and the Exhibit Defendants' Rake, the poles have no useful

107 function except to keep the horses off the teeth in defendants' machine, and possibly off the wheels in that of Kenaga. Is that statement correct?

Ans. It is not, for the reason that was it not for the horses being attached to the forwardly projecting stiff poles (laterally I mean) in turning the rake to the right or left the outside horse would draw the rake around, causing the teeth of the rake to strike the pivot horse's feet; or, in other words, was it not for these stiff poles the horses could not be kept in any position by one driver so as to guide and manage the rake at all, as the horses thus attached it is impossible to move one end of the rake without keeping the horse on the other end of the rake in exactly the same position and direction as the other.

Int. 66. Please examine the Exhibit Acme Lithograph and state whether the poles at the sides of the rake as there shown differ, if

at all, in location and arrangement from the side poles as described and shown in the Kenaga patent.

Ans. They do not differ. They are substantially the same in each case.

Int. 67. Examine the Exhibit Wicks Patent and state whether if a pair of horses were hitched to the pole, as shown in said patent, such rake could be advanced with its load onto a stack or ricker platform and be backed therefrom to discharge the same in practical operation.

Ans. It could not be so operated, for the reasons which I stated touching the Currier patent, that the horses being directly in front of the gathered load as well as the tongues and cross-bars, as
108 shown in figure 2 of the Wicks patent, would prevent the load being drawn onto a ricker or up to a stack and the horses could not back the rake from beneath its load, for the reason of the hay being between the team and the gathered load of hay, as Wicks in his specification states that in order to discharge a load of hay from his rake the rake is necessarily revolved by lifting the same up at the rear end and bringing the teeth in contact with the ground to discharge the load.

By consent of counsel, the further taking of testimony is adjourned until Thursday, August 26th, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

THURSDAY, *August 26th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

Int. 68. You may state about how wide across the teeth the ordinary sweep or drag rakes were as commonly used before the Kenaga invention.

Ans. Sixteen to twenty feet.

Int. 69. Without practical test being made to demonstrate the fact state whether or not there would be reason for doubting whether horses could be connected as far apart as the ends of the ordinary sweep by hitching poles like that of Kenaga and yet be controlled by a single driver, as provided in said patent, without the use of cross-check lines.

109 Ans. There would be reason to doubt that horses, so hitched to a rake, could be practically driven and operated so attached and so far apart. With all the experience which I have had with rakes of this kind, and their various means of hitching to and operating them, as described in Kenaga's patent, I did not think it was possible to so operate a rake, until after I had seen the same fully demonstrated; and, in my experience in selling and introducing the Kenaga rake, I have found that farmers and dealers alike would doubt that the rake could be operated by one driver driving and managing the two horses in this way, and this they would doubt after seeing our lithographs and circulars containing testi-

monials of farmers and dealers in implements that the rake was so easily thus managed.

Int. 70. If thills were employed at the ends of the rake, connected to the draft bars, as suggested in the Kenaga specification, would or would not the projecting poles still be necessary to produce a practically successful machine?

Objected to for the reason that it proposes to change the Kenaga specification.

Ans. It would be necessary to employ the poles.

Int. 71. Why?

Ans. For the reason that thills, such as are used on sulky hay-rakes or buggies, rigidly attached at two points, that two horses could not be so worked to the rake—the thills would have to be brought to one pivot center on the draft bar, and, as this would afford no rigid connection to the body of the rake, the poles must
110 necessarily be used to attach the horses in order to form leads, guards, and guides, to enable one person mounted on the rake or walking behind it to guide and manage the team and operate the rake successfully.

Int. 70. Omitting the poles, why could not thills be worked in the rake, if attached at two points, without lateral swing?

Ans. For the reason that should one horse move before the other the bearing would come against the side of the horse standing and break the thills. The horses hitched at the ends of a rake must necessarily have the stiff, lateral, rigid attachment to their front ends, in order to keep each horse in the same position relative to the body of the rake and direction desired to be traveled, either backward or forward.

Int. 73. Would not this same risk of breakage which you have mentioned in respect to thills apply also to the use of poles, as set forth in the Kenaga patent when used alone; and, if not, why not?

Ans. There is not the same risk on the poles when used alone, as the breast strap in front of and to the side of the horse gives him room to swing in walking, and not being confined between the shafts, the pole to which he is only attached in front extending forward beyond his breast, the movement of the opposite horse controls the tongue or pole, guides and leads the horse, which could not be done without great danger of breaking the shafts if each horse was confined between them.

Int. 74. The defendants' expert states that the lateral rigidity of the pole, as in the complainant's and defendants' rakes, serves to keep the horses from getting on the rake teeth and also
111 slightly lessens the effort of backing. If such assertion be correct, does it state all the purposes subserved by the lateral rigidity mentioned?

Ans. These are not all the purposes subserved by the tongues. It is true that the poles, being stiff laterally, serve to keep the horse on the left when turning to the left off the rake teeth, while on the opposite end the horse is led around by means of the stiff lateral

tongue. Was it not for this stiff lateral tongue the horse on the right could not thus be turned by the single driver.

Int. 75. Look at the Exhibit Rumrill Patent and state whether, if the horses were hitched at the front to the bars marked F and at the back to single-trees attached to the axles, links, or hooks, the rake could be managed in backing and turning like that of the Kenaga patent.

Ans. They could not, for the reason that the bars F are located directly above the end rake teeth, and, the single-trees to which the horses are attached for draft being in front of the wheel, there would not be room enough for the horse to work, for reasons which I have heretofore stated touching the Hudson patent, and that as the bars F of the Rumrill patent do not extend outward from the ends of the teeth, they would not serve as guides or guards to aid in guiding the team or prevent them from being entangled in the teeth, as I have stated to be necessary and as shown in the Kenaga patent. It would therefore be impossible to back the rake with the team hitched in this way.

Int. 76. Suppose the horses were hitched by breast straps at the front, at the pencil line marked P. M. of the Rumrill drawing,
112 and at the back to single-trees attached to the axle, links, or hooks, the rake teeth being eight feet in length, could the rake be managed in backing and turning as that of the Kenaga patent?

Ans. It certainly could not be so managed, as the space between the line marked P M on figure 2 of the Rumrill drawing and a point to which a single-tree would be attached would not be more than three feet, would not give room for the horse to be hitched thereto, to say nothing of them being moved to guide and draw the rake in either direction, and for obvious reasons which I have mentioned touching the Hudson patent.

Int. 77. Look at the Exhibit Acme Lithograph and state about how long in practice the pitcher teeth are made in the ricker there shown.

Objected to as immaterial, incompetent, and not in rebuttal.

Ans. We make them nine feet long. I believe all other rickers of this kind are about the same length.

Int. 78. About how far apart are they set?

(Same objection.)

Ans. Twenty-four inches.

Int. 79. About how long are the vertical pitcher fingers which are shown extending upward from the rear ends of the pitcher teeth?

(Same objection.)

Ans. We make them from four to five feet long.

Int. 80. About how high off the ground are the rear ends of the pitcher teeth at their point of attachment to the pitcher fingers when the pitcher is on the ground?

(Same objection.)

Ans. About eighteen inches.

113 Int. 81. Look at the Exhibit Hudson Rake and state how the dimensions of the individual teeth shown in said exhibit differ from the dimensions of the pitcher teeth in the ricker above referred to.

(Same objection.)

Ans. The ricker teeth are some thicker and wider than the rake teeth, and, as I have heretofore stated, nine feet long, whereas the two middle teeth of the Hudson rake are eight feet long and the two outside teeth of the Hudson about ten feet long.

Int. 82. If horses were hitched to a rake in front of the teeth thereof could the loaded rake practically be drawn onto a ricker such as shown in the Acme lithograph, the hay be deposited thereon, and the rake withdrawn?

(Same objection, and the further objection that the question is limited to a particular stacker which is only one of a great variety.)

Ans. It could not.

Int. 83. Could it be so done upon any ricker in the market of which you have knowledge?

(Question objected to as being limited to a class of stackers known as rickers.)

Ans. It could not upon any ricker upon which the hay is drawn by means of a rake of this class or any ricker or stacker, to my knowledge. I mean by a rake of this class a long, large sweep-rake or rake to which horses are attached in raking hay.

Int. 84. Do you wish to be understood that a rake to which horses were hitched, as described in the Kenaga patent, would not
114 deposit its load and withdraw the same therefrom in connection with a ricker like that shown in the Acme lithograph?

Ans. No; I do not. I mean that if the horses were hitched directly in front of the teeth by means of ropes or poles, bringing the horses in front of the load of hay, that such rake could not be drawn onto any rickers or stackers of which I have knowledge.

Cross-examination by L. L. Bond, Esq.:

X Int. 85. What is the distance between the rake teeth in the rake which you manufacture?

Ans. We make them various distances. For raking short prairie hay we make them closer than for timothy or clover hay.

X Int. 86. What is your widest and what is your narrowest space between the teeth?

Ans. In our widest the distance from the center of the teeth is twelve inches; in our narrowest, nine inches, which makes the distance between the edges of the teeth three and a half inches less in each case.

X Int 87. The pitching machine shown in the Acme lithograph is known as a ricker, is it not?

Ans. We call it a ricker, but it is used for ricking, stacking, and loading hay as well.

X Int. 88. Rumrill in his patent does not give any dimensions or lengths for any of the parts, does he?

Ans. I don't find that he does from his specification.

X Int. 89. From the number of teeth shown in the drawing you would not understand it to be a very wide rake, would you?

Ans. I don't know as I could say as to that. He states that his rake is designed to be used to gather cured hay from the
115 windrow, which does not require that the teeth be so close together as when used for raking or gathering the hay from the swath.

X Int. 90. Raking from windrows does not necessarily require as wide a rake as raking from the swath, does it?

Ans. I don't know that there would be much difference. This would depend very largely on the amount of hay a farmer would be satisfied in gathering at a load. The largest sweep-rakes I have ever seen used were used exclusively for gathering and hauling in the hay to the stacks from windrows on prairies in the West.

X Int. 91. When windrows are formed by the use of wire-tooth, revolving sulky, or drag rakes they are nearly of a size, are they not, and necessarily limited in the amount of hay by the capacity of such rakes to dump the hay and pass over it?

Ans. They are, usually.

X Int. 92. Now, if you take a windrow endwise—that is, by driving a horse along each side of it—a practical rake could be made quite narrow, could it not?

Ans. It could be made about eight feet wide, but such rake would not have the capacity to rake as much hay as would be economy to gather and haul a distance to the stack as such rakes are used.

X Int. 93. The capacity of a narrow rake could be increased by lengthening the teeth, could it not?

Ans. It could; but it would greatly increase the danger of breaking the teeth and of their points being caught in obstructions, and I have found it not to be practical to use a rake tooth much longer than eight feet.

116 X Int. 94. Do you not find in the Rumrill patent a provision for greatly varying the distance at which the points of the teeth should come in contact with the ground in front of the axle?

Ans. I don't so understand the patent. I understand that the device of Rumrill for shoving the rake teeth back onto the axle is to carry the rake where desired empty. If the points of the teeth of the Rumrill rake should be drawn backward near the rake wheels it would throw the points of the teeth in such position as to run them directly into the ground, as I understand there is no arrangement or adjustment by which the hind parts of said teeth can be brought below the axle, and I have found that it is only practical to successfully operate a rake with horizontal teeth and have the hind part of the teeth extended above the ground more than one inch for every foot the teeth extend forward.

X Int. 95. A greater incline than one inch to the foot could be used for windrows, could it not?

Ans. Not much more and prevent the teeth from running into the ground, as the teeth must be on the ground in raking hay from windrows as well as from the swath.

X Int. 96. That would depend somewhat upon the way in which the teeth are pointed, would it not?

Ans. It would; but to rake hay with horizontal teeth of this kind the extreme points of the teeth must necessarily be close enough to the ground to run under the hay.

X Int. 97. Why may not a hitching chain in front be attached directly to the inner hame ring or hook without the intervention of breast straps or chains?

117 Ans. They might be, but, in the process of backing, the strain, being all on one side of the horse's neck or collar, would cramp the collar on the horse's neck and choke it, whereas if attached to the center of a breast strap the bearing comes, in the process of backing, on the top of the horse's neck and collar pad and puts the draft on the center of the animal, as in backing a wagon or other vehicle.

X Int. 98. If the chain was hitched to the hame ring it would shorten the distance for the horse between the front end of the pole and the single-tree somewhat, would it not?

Ans. I don't think it would make but little difference, for the pole must necessarily extend forward beyond the horse's breast, and an eighteen-inch backing chain is about as short a hitch for the horse at the end of the pole as can be successfully used and allow the horse sufficient room to walk by the side of the pole.

X Int. 99. When you use metal brackets or arms at the front ends of the poles, as shown in the Kenaga patent, do you give them a lateral projection of eighteen inches?

Ans. No; not so much as in using the rake with laterally projecting hook. I have also employed short chains with a ring in them for the breast strap to pass through as well.

X Int. 100. When such outwardly projecting brackets or hooks are used what objection is there to making the poles parallel with and over the outer teeth?

Ans. For the reason that poles projecting outwardly from
118 the teeth, as shown in the Kenaga patent, in the process of turning the horses come against the front or breast of the horse before the teeth or any other part of the rake would strike it, thus causing him to step aside and not become entangled in the teeth. With the outwardly projecting bars or tongues they serve to keep the horses directly in a line of draft from the center of the single-trees, which would not be the case if the horses be loosely hitched (which is necessary) at the front of poles parallel above the rake teeth.

X Int. 101. Might not the irons or hooks be carried out so as to produce this result by the breast strap and thereby avoid the striking of the horse's side by the pole?

Ans. I don't think it could, for the reason that the horses soon

become very sensitive to the touch of this pole and do not thus pull or strain the tongue, as they would do if the bearing was entirely against their shoulders and collars, and would be very much more liable to break the tongue if they were arranged as you have mentioned. Then also by reason of the tongues extending outwardly to a point almost directly in front of the center of the line of the draft or single-tree gives much more strength to the tongues, and they need not be made so heavy as they would arranged as you have mentioned.

X Int. 102. When a horse becomes sensitive to tongue-lashing, as it is called, does he not pull away from the tongue as far as the harness will let him?

Ans. Not always so, but to that extent, as I have stated, chains at least from sixteen to eighteen inches long or other loose
119 connection is preferable in operating a rake, as shown in the Kenaga patent, with poles at their ends.

X Int. 103. As shown in your Acme lithograph, is not the pole below the collar of the horse, even when the front ends of the teeth are elevated for travelling?

Ans. They are about on a line with the lower part of the collar, as shown in the lithograph, but that does not show it exactly as it should be. If the points of the teeth are elevated eighteen inches or two feet at the points the ends of the tongues would be about as high as the hame tugs.

X Int. 104. How high above the ground do you make or locate the front ends of the poles in your machine, the teeth being understood to be upon the ground?

Ans. About three feet and a half.

X Int. 105. Of what size are your poles in cross-section at the outer end and at the point of attachment to the rake?

Ans. They are three and a half by four inches at their back end, and taper to two and three-quarters by three inches at the front end, I think, are the exact dimensions.

X Int. 106. Suppose the rake wheels were located between the outer teeth, as in the defendants' machine, would you still consider the outward projection of the front ends of the poles important if you used the Kenaga bent irons at their front ends?

Ans. I think they would be, for reasons which I have heretofore stated, necessary in the guidance and management of the horses. I don't understand that the location of the wheels would make any difference in this regard, as in the Kenaga device the draft
120 bars extend outward at the rear of the rake, and the pole C extending forward in front of the horse keeps him off the rake wheels when hitched to the rake.

X Int. 107. When the rake wheels are located outside of the tongue, as shown in the Kenaga patent, they make the rake that much longer, do they not, and furnish an additional length from which the horse must be kept clear when hitched behind them?

Ans. It makes the rake as much longer as the spindles necessary for the wheels, but we use the same draft bars and tongues when we use the rakes with wheels on the end.

X Int. 108. If you took the same rake that Kenaga took to use with his tongue and applied thereto the Currier poles parallel to each other, in line with and over the outer teeth, would you not still have the Kenaga rake, or would it, in your opinion, be another and different rake?

Ans. If I understand your question exactly, presuming that the rear part of the Currier tongues were bolted to the same blocks at the rear of the rake, as shown in the "Complainant's Exhibit Acme Rake Model," I think they would serve the same purpose for backing, though not as well as in the Kenaga device; neither could the rake with these poles be drawn onto a pitcher or ricker fork. I think that it would be substantially the Kenaga rake, though not as practical as with the poles shown as Kenaga arranged them for either backing or other purposes.

X Int. 109. The only difficulty about delivering hay to
121 such a stacker or pitching machine as shown in the Acme lithograph which would exist would be in the cross reins or checks, as you have called them, would it not, when the poles are arranged as Currier has them on a machine as supposed in the previous question?

Ans. No; there would be the difficulty of the forward ends of such poles striking the pitcher fingers.

X Int. 110. Do you understand that the method of arranging the lines for driving the horses is an important feature of the Kenaga patent?

Ans. I think it is an important feature, taken in connection with all the other results to be obtained.

X Int. 111. Do you understand that the statement in the Kenaga specification, "by having the reins split back to a point in convenient reach," etc., means anything more than that there are to be two lines for each horse, so that the attendant may guide a horse with each hand?

Ans. I don't understand that the patent definitely states whether or not the line should be double from the back band rings or whether should only be a single line from that point so long as the horse is attached to the end of the pole and a line or lines running directly from the driver to the horses' bits. They could be operated equally well one way as the other so long as the driver has not to watch or guide his horse by the lines, as each horse is guided independently by being attached to the front end of the lead poles.

X Int. 112. You would not understand, would you, that if the driver or attendant used check or cross lines in operating a Kenaga
rake that he thereby avoided the patent, would you?

122 Ans. I am not sufficiently posted on the scope of invention to answer that question definitely.

X Int. 113. You, as a business man, would think it a pretty hard case if he did, would you not?

Ans. We are forced to submit to a good many things seemingly hard in patent business.

X Int. 114. Do you wish the court to understand, then, that you have no opinion on this subject and do not know whether the pres-

ence or absence of cross-check lines has anything to do with the patent?

Counsel for complainant objects on the ground that the question calls for an interpretation of the patent involving matter of law with which the witness is not familiar, and insists that the question should be directed to the matter of fact whether if cross-checks were arranged running between the horses of the Kenaga rake the rake could be used for the purpose for which it is designed.

Ans. The cross-checks would be superfluous for any of the purposes for which the rake is designed, but I have not formed an intelligent opinion to be prepared to answer your question definitely.

X Int. 115. If you was delivering hay to a stacker which worked with a rope and grapple and a crane top with a large fork at the end of the rope, cross-line checks would not be in the way, would they?

Ans. They would be in the way if the fork was on the ground directly under where the load should be deposited. They would also be objectionable for reasons which I have stated in my direct testimony.

123 X Int. 116. Have you ever seen any crane-topped derrick stackers either in use or otherwise?

Ans. I have seen a great many of them and have used several different kinds.

X Int. 117. Is not one of the advantages claimed for those using a fork that they can take their load from any point within reach and deposit it at different points upon the stack?

Ans. It is; but in operating such derrick you could not deposit the hay at extreme points on the rick longer than twice the length of the swinging upright cross-beam, which is usually from seven to nine feet long, and this distance we distribute the hay by means of our improved hay-rickers, as the forks are usually twelve to sixteen feet wide and the hay will usually extend a foot or more on either side of the fork; so when elevated and deposited on the rick the hay is in much better shape to be stacked than when dropped in round bunches or wads from the derrick forks; and, furthermore, it should be observed that with the improved platform or toothed pitchers the whole and entire loads of the rakes are elevated and pitched onto the ricks at one time, whereas it would require at least a half a dozen loads of the derrick fork to elevate the same load, and also require the labor of one man to assist in bunching up the hay in shape to have the fork hold it and another strong man to operate the fork.

X Int. 118. Would not the rake shown in "Defendants' Exhibit Wicks Patent" be a good rake to use in connection with a derrick stacker?

Ans. It would not.

124 X Int. 119. Why not?

Ans. Because of the great amount of labor necessary to operate it and the liability of breaking the machine when dumping it over to discharge the load. As heretofore stated, teeth in a rake of this

construction, in order to gather as large a load as would be economy to haul to ricks or stacks, should be about eight feet long, and in dumping a rake with teeth this long would be quite difficult. Just imagine how you would like to undertake to dump a rake with teeth as long as shown in the Hudson patent. I think it would be totally impracticable.

X Int. 120. There is no particular difficulty in discharging revolving rakes by upsetting them, is there?

Ans. There is not; but the teeth are only about eighteen inches long, extending through the beam, so when revolved they are in position to go and rake another load; whereas with the Wicks rake it would have to be reset each time before commencing to gather a load, which would be quite as difficult or more so than dumping it to discharge a load.

X Int. 121. The Wicks rake is operated by two horses and a single driver or attendant, is it not?

Ans. The specifications may so state, but I doubt if ever the same was done, as I don't think it would be possible to do so if the rake was made of sufficient size to gather a load of hay, such as shown in the Acme lithograph.

X Int. 122. Acme lithograph shows rather a fancy load, does it not, particularly at the points of the teeth?

Ans. Well, rather so; all pictures are made to look well.

125 X Int. 123. With the basket arrangement to the handles shown in the Wicks patent a part of the load could be carried back of the rake head, could it not, so as to gather a pretty fair load, with rake teeth not more than two and a half or three feet long?

Ans. I don't think the Wicks patent was intended for gathering and hauling hay to ricks and stacks, as it is called a revolving rake, and intended to be used more for windrowing hay, and I don't think it would serve a very good purpose for that; but to return and answer your question more definitely, I think that the rear part or handles of the rake would, of course, hold more or less hay, but should the hay pile well back onto these handles and the rear part of the rake, would be much more difficult for the operator to dump and discharge the load.

X Int. 124. Would the addition of thills to the Kenaga machine necessarily be anything more than the adding of two more poles—that is, one to the outside of each horse?

Ans. I understand thills to be, as used in buggies, sulky hay-rakes, or other one-horse vehicles, small, strong bars of wood fitting closely to the horses and passing through supports of the harness at the sides of the horses, with straps also connected to prevent such rakes or vehicles from coming in contact with the horses' hinder parts, and with a tongue rigidly arranged on the outside of the horses, similar to that shown in the Kenaga patent, I would not properly call thills, as thills do not necessarily extend further than a horse's collar.

126 X Int. 125. Did you ever see in any of the implements or vehicles referred to by you a pair of thills attached by a single, central pivot?

Ans. I have seen them on one-horse carts with short stay-straps. I have also seen thills made in this way used on reversible lever hay-presses without any stay-straps and other vehicles and implements of which I cannot just now mention.

By consent of counsel the further taking of testimony is adjourned until Friday, August 27th, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

FRIDAY, *August 27th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

X Int. 126. The usual way, however, of attaching thills is to attach them at two points with pivots or couplings which only permit a vertical movement, is it not?

Ans. It is when the horse or animal is desired to be hitched directly in front of the vehicle to be drawn.

X Int. 127. In turning these sweep-rakes with poles, is the rake turned from the outer end of the pole or by advancing one horse and holding back the other so that the strain comes upon the whiffle?

Ans. In turning the rake, if turning to the left, the horse on the left is held back and the horse on the right is moved up, which by reason of the tongue or poles keeps both horses in the same
127 position relative to the rake until the proper direction is reached desired to be traveled, and if desired to turn the points of the teeth of the rake in directly the opposite direction. This movement could be kept up until the rake was turned entirely around. If desired to be turned to the right the same operation is required.

X Int. 128. If the driver should attempt to turn one of your rakes around when loaded by so handling the horses that the endeavor would be to turn it from the points of the tongues or poles would he not be liable to break the poles or split them out of their fastenings?

Ans. I think not; I don't find any difficulty. We have not had any difficulty in that regard.

X Int. 129. If you had an unskilled driver and he should attempt to turn the rake to the left by the left-hand horse would he not be liable to break out the tongue or pole on that side?

Ans. I think not, as rakes so made have been successfully operated from the start by small boys without having previous experience, for the reason that any boy with intelligence enough to guide and manage a team would readily understand that it would be impossible to have the horse on the opposite end stand still and turn the rake entirely by the horse on the left, for as in attempting to pull the left horse around would have the effect to back that end o the rake instead of turning it, and thus discharge the hay, if the rake be loaded, from that end of the rake. In turning a rake loaded

it is necessary that both horses move at the same time while
128 the pivot horse is moved slowly, just enough to keep the rake teeth moving slowly forward, while the horse on the outer end, having farther to travel, must travel much faster.

X Int. 130. In turning the rake there is a heavy side friction upon the teeth, is there not, which friction is increased by the weight of the load upon them?

Ans. There is certainly some more side friction on the teeth when turning than when going directly forward, but the teeth must necessarily be made large and strong enough for this purpose.

X Int. 131. Now, if you attempted to turn the rake solely from the front ends of the poles, would not the poles be liable to be broken or detached?

Ans. Do you mean that if horses should be attached to the extreme forward end of the pole for draft by means of the single-trees?

X Int. 132. As to the effect on the rake I do not understand that it would make any difference, except as to which end of the horse you use, whether you moved them by single-trees hitched there or by the breast straps alone without bringing the whiffletrees into use, the substance of the question being simply as to whether the poles were strong enough in one of your rakes to be used as the sole means for turning the rake.

Question objected to as indefinite, it not appearing whether or not the horses are to be hitched at the back to projecting draft bars or like expedient to aid in drawing the load as the turning proceeds.

Ans. I think, if the proper harness could be devised by
129 which to properly hitch a horse to the extreme ends of these tongues, that they would be strong enough to turn the rake, but this would be entirely unnecessary or advisable in properly operating the rake.

X Int. 133. If this feature of strength is non-essential, why could not a Kenaga rake be operated successfully by using a pair of thills fastened to the ends of the rake by two pivots each, in the ordinary manner, and entirely omit the tongues?

Ans. In my last answer I did not mean to convey the idea that it was practical to so hitch horses to the ends of the poles of the Kenaga rake entirely in front and to the extreme end of the poles, as in so doing the use and value of the tongue for backing and guiding the horses would be, destroyed, so arranged. I only intended to say that the tongues would be, as we make them after the pattern of the Kenaga rake, sufficiently strong to stand the strain of turning the rake, and then only while lightly loaded or empty, and no interference with the points of the teeth. I have experimented and tried to work two horses between thills, one at each end, with the ends of the thills rigidly attached laterally, but vertically pivoted to the draft bar of the Kenaga rake without the lead poles, and found that the same could not be successfully done, as, the horses being confined between the two rigid bars, in moving one horse before the other in turning the thills would break square off. As the entire

leverage of the outside horse would be brought to bear on the pivot horse and as the shafts or thills serve no leads in guiding the two horses at the same time, my experiment was a failure. With horses loosely hitched between tugs at the outer end of the draft
130 bar, and outward and forward at the end of the pole gives much more room and allows the horses to move sideways a distance of three or four feet without any interference with their sides. The distinction between thills and poles, as commonly understood, is: thills do not extend forward and beyond the front of the horse, neither are horses attached to the ends of thills by means of breast straps, while in poles or tongues they are.

X Int. 134. Do not thills ordinarily extend beyond the collar or breast of the horse?

Ans. When the horse is moving forward the ends are about opposite or as far forward as the breast of the horse:

X Int. 135. How far forward did you extend the thills in the rake you experimented with?

Ans. About the distance I have mentioned relative to the horse.

X Int. 136. Why does not the inner thill guard and lead or push the pivot horse the same as a pole, and why would not the thills furnish the same lead and guide for the outer horse that the pole does, or even a better guide, as he then has a pole on each side?

Ans. For the reason that the thills, in order to get them to work in the harness, must be close to the horse's sides, and would be too close to serve as a lead or guide by a breast strap hitched to and forward as used with the poles. With the use of thills, the backing straps were at the hinder part of the horse, as used in other implements or vehicles where thills are employed. The single-tree was pivoted in the usual manner and had traces hitched to the
131 single-tree, which must be the case to any draft, for if the tugs were hitched independent of the other, rigidly, with no pivot in the center, the result would be to pull all on one side or the other of the horse's shoulder.

X Int. 137. How far are the teeth extended back of the axle in a full-size Kenaga rake?

Ans. I don't understand the distance to be limited to any exact distance. We have made the rakes with different extensions back of the axle of the rake, varying from twelve to eighteen inches.

X Int. 138. So far as the action of the rake is concerned, in so far as it is connected with the poles, the rear extension of the two outer teeth is all that is operative in the Kenaga rake, is it not?

Ans. I don't understand the question. I can't comprehend that question so as to give you an intelligent answer.

X Int. 139. In your Exhibit Acme Rake Model are not the blocks to which the poles are attached located upon and supported by the rearward extension of the two outer teeth?

Ans. The end head blocks, the rearward part of the two outside teeth, the two lower, and the top head piece in the full-sized rakes are all bolted solidly together by means of long bolts passing from the top of the top head piece and the top edge of the rear part of the head blocks down through, bolting all these timbers together.

X Int. 140. If you should cut out the middle portion of these end blocks, so as to leave them in form like a frame, or make them actual frames, they would be the same thing, would they not?

132 Ans. They would not be in the same shape, neither would they be so strong as to leave them as they are.

X Int. 141. Would they be the same in substance when made of four pieces into a frame, or would they be substantially different head blocks, in your opinion?

Ans. They would be more expensive to make in four pieces in a frame; neither do I think the frame could be made so strong as the solid piece of wood set edgeways with bolts passing through them, drawing the grains of the wood together, giving them additional strength, but I don't know that it would make any difference in other respects so long as the necessary purpose for which it is intended is accomplished.

X Int. 142. What are the dimensions of your head blocks in a full-sized machine in length and height?

Ans. We have made them of various heights—from eight to twelve inches—and from t velve to eighteen inches long. The usual height is ten inches—sixteen inches long.

X Int. 143. At what height should the top cross-rail be placed to properly hold the hay and prevent it from falling behind the rake?

Ans. If only four or six inches high it would prevent it from falling back and behind the rake, as the hay in gathering fills on that part of the teeth first and forms a head solidly packed together, which all moves off together when backing and discharging the load, but with blocks ten inches wide and the top cross-piece two inches thick, as we make them, forms the head twelve inches high above the teeth.

X Int. 144. Would this upper cross-rail serve any useful

133 purpose in stopping the hay if its under surface were fourteen or sixteen inches above the rake teeth?

Ans. It would to some extent, if it was two feet above the rake teeth, in gathering windrows or cocks of hay. The lower head piece of the rake forms a stop for the hay in gathering from the swath, as there is more or less of the hay hanging between and around the teeth, and causes it to stop when brought in contact with the cross head piece.

X Int. 145. Does it make any difference in backing a rake or wagon whether the pole or thill have a downward curve at the rear end or whether they are on straight line between their connections with the axle and the breasts of the horses?

Ans. In what regard do you mean any difference?

X Int. 146. In regard to the amount of power required and the line in which the power is exerted.

Ans. I think it does, as in a rake constructed after the manner of the Kenaga patent it is necessary to have the rear part of the tongue as near on a line with the center of the axle as is possible or convenient to put it in order that the rake may be more easily backed and without tilting the teeth upward at their points to prevent dragging the hay off backwards. Wagon tongues are usually

located as near directly in front of and on a line with the axle as possible. Shafts or thills are usually curved upward from their connecting point to the vehicle for the purpose — elevating the single-tree high enough to bring the line of draft in proper distance with the horse's shoulders.

134 X Int. 147. If you should elevate the end blocks of the Kenaga rake and attach the poles to them so that the poles would be horizontal, and did not change the relative position of the front end of the tongue at the point where the horse is attached, would not the rake have precisely the same action that it has when the rear end of the poles are down as you place them?

Ans. It would not have the same effect, as the distance between the rear end of the pole and the center of the axle would be increased. The effect would be to tip the rake backwards, throwing up the points of the teeth and prevent the teeth from discharging the load.

X Int. 148. You are very certain that you are right on this point, are you not?

Ans. I think I am, for that was my experience in attempting to operate the Hudson rake with the poles or bars C elevated at their rear ends about the same height above the head of the rake that you mention.

X Int. 149. In backing a rake where is the point of resistance—at the axle or on the ground?

Ans. I think at the center of the axle; but in a meadow, which is not perfectly smooth like a floor, the wheels having to encounter obstructions, tussocks of grass and holes and ruts, makes a rake harder to back than it would be on a smooth surface.

X Int. 150. In your "Exhibit Acme Rake Model" the poles are connected to the rake-end blocks at points above the axle, are they not?

Ans. They are; but it was an oversight in the model-maker in so placing them, as in our full-sized machines the rear end of the tongue rests well down and on top of the rake head.

135 X Int. 151. Do you think that difference changes the operation of the rake in any respect?

Ans. The difference between that shown in the model and as we make them would only be about two inches. This difference might not be materially perceivable in the operation of the rake.

X Int. 152. As shown in the Kenaga patent, the forward attachment of the tongues appears to be to the upper cross-bar of the rake head. Such an attachment would bring the tongue higher above the axle than the form shown in the model does, would it not?

Ans. This would depend somewhat upon the thickness of the head blocks. In the manufacture of our full-size rakes the top head piece has a gain cut out of its upper end to admit resting on the flat surface of the tongue and the tongue bolted thereto, as shown in the patent.

X Int. 153. Do you understand that the Kenaga patent shows any head blocks at all or any such as are shown in the model?

Ans. As the drawing in the patent is only a top view, these blocks

would not be perceivable, as they set directly on top and above the rear parts of the rake teeth. They could not be seen in a drawing of this kind if the front ends of these blocks did not extend farther forward than the edge of the top cross-piece.

X Int. 154. The drawings, however, clearly indicate how the tongues are attached to the rake heads, do they not?

Ans. For the reason that rake heads at the date of the
136 Kenaga patent were arranged and constructed similar to those in Acme model and Exhibit Defendants' Rake I think they do.

X *Ans.* 155. The height at which the tongues or poles are attached to the rake head above the axle is a matter of better or worse, is it not? The higher you go the worse it is for the operation of the rake, is it not, according to your theory?

Ans. I think it is.

X Int. 156. If you should set the Hudson poles down within a foot and a half of the axles it would work pretty well, would it not, if you wanted to back it by the poles, supposing them to be long enough to hitch to for the purpose of backing?

Ans. No, indeed; I think not for reasons heretofore stated in my testimony regarding these bars C on the Hudson rake being parallel above the outer-end teeth of the rake. They would not keep the horses from becoming entangled in the rake teeth, either in turning to the right or left, and as the back ends of the end teeth of the rake extend backward, while the liability of tipping by reason of lowering the rear ends of the bars C would be lessened, I think that the rake would still tip backward and cause these ends to strike the ground in backing, and, as constructed in the Hudson rake—the upright supporting posts for the bars C are provided for no lateral strain upon them—would be very liable to break.

X Int. 157. Do not the side teeth in the Kenaga rake extend back the same as they do in the Hudson rake?

Ans. They do, but not so far.

137 X Int. 158. Supposing the wheels to be of the same size, and supposing the rear standard of the Hudson machine to be made, as stated by him, of a two-by-four scantling, then, according to the drawings of the respective Kenaga and Hudson patents, the difference in the rearward extension from the axle of the side teeth would not exceed two inches greater for the Hudson than for the Kenaga, would it?

Ans. The rake wheels in the Kenaga patent are not shown to be as large as those shown in the drawing of the Hudson patent. The length of the teeth back of the axle in the manufacture of the Kenaga rake is about twelve inches, whereas those in the Hudson rake, made from a scale of proportions, assuming the teeth to be eight feet long, as stated by Hudson in his patent, makes the ends of the two outend teeth on the Hudson machine two feet and three inches long.

X Int. 159. Hudson's statement is "about eight feet" instead of a specific eight feet, is it not?

Ans. The specifications so state, I find.

X Int. 160. Hudson makes the following statement, to wit: "Ex-

tending across these three uprights there is a bar placed, which not only gives greater strength to them, but also prevents the hay from slipping back over the prongs." In view of that statement and in view of the fact that the drawing shows the under edge of this bar on an exact level with the tops of the wheels, don't you think that you have got this bar altogether too high in the section of full-sized machine which you have produced and which is marked "Complainant's Exhibit Hudson Rake"?

138 Ans. This may be so, taking the wheels that are on the Hudson rake as a standard of measurement, but as these are the original wheels used by Hudson in the construction and operation of his only rake I have used them in the construction of this rake rather than larger wheels, as shown in his drawing. If I should have used as large wheels as shown in the drawing in the construction of this rake it would have been much more liable to tip backward and also brought the single-tree much further forward and nearer the end of the bar C than the ones on the rake. If in constructing this rake the cross-bar should have been lowered to the top of the wheels on the rake it would have greatly lessened the strength of the front upright posts and caused them to have broken off very much more easily in attempting to back the rake by means of the bars C. In constructing this rake I built it of as strong material and with a view to giving it a fair test in operating it, if possible, like the Kenaga rake.

X Int. 161. If the location of the Hudson cross-bar above the rake head is a proper one to prevent "the hay from slipping back over the prongs" in a Hudson machine it would be a proper one in a Kenaga, would it not? I mean as located by you in the Exhibit Hudson Machine.

Ans. The cross-bar would, of course, serve the same purpose in that regard on one rake as well as the other.

X Int. 162. Does not the Hudson drawing show that at least three-fifths of the entire length of his upright posts is below the rim of the wheel?

Ans. This may be, but the drawing would indicate a wheel at least four feet in diameter in the Hudson patent, which would

139 be totally impractical to work on a rake of this kind, with teeth eight or about eight feet long, with the teeth elevated where they pass through the axle as high as the center of the wheels as that shown in the Hudson drawing.

X Int. 163. If the pole, having the width shown in the Hudson patent, was bolted in the lowest hole shown would not the pole be nearly or quite in contact with the cross-bar?

Ans. Yes; it would be a little nearer than that shown in the Hudson rake, which fact was unnoticed by me in constructing the Hudson rake, but I rather divided the matter of locating this cross-bar to serve the two purposes, that of preventing the hay from slipping back over the rake, as stated in Hudson's specifications, and also give strength to the forward upright posts.

X Int. 164. Do not the Hudson drawings show that when the

poles C are in the highest adjusting holes that the front ends of the poles would still be lower than their rear ends?

Ans. No; I think not, if I understand the question.

X Int. 165. In experimenting with the Hudson rake reconstructed by you did you try or apply the Kenaga metal extensions or hooks at the front ends of the bars C?

Ans. No; I did not, for the reason that I, after measuring the distance between the ends of the bars C and the single-tree and seeing the limited room to hitch a horse, if I should have attached these hooks or metal extensions as shown in the Kenaga patent—I would have injured the horses with these hooks in attempting to so work them, and I therefore only used the chain and breast strap.

140 X Int. 166. If you had extended such arms around in front of the horses' breasts why would they have been any more liable to injure a horse in a Hudson than in a Kenaga rake?

Ans. For the reason that in the Kenaga rake and as described and as shown in Kenaga's drawings there is a distance between the single-tree and the front end of the poles to which these hooks are attached to allow the horses being hitched to the single-trees for draft, and the poles C, if these hooks extend far enough forward, do not interfere with the horses' breasts in drawing the rake, whereas in the Hudson rake there is not such room.

X Int. 167. That depends, does it not, upon the length of the shank which you give to the hook or the distance which you extend it forward of the wood?

Ans. If the hook should be prolonged and made to extend forward of the bars three and a half or four feet and then curve out and from the line of the bar, giving room for the horse, it would not strike the horse's breast in a forward movement, but would not lessen the liability of the horses becoming entangled in the teeth, but would increase the liability of the lateral spring of the bars and more easily cause the bars to spring and let the horses onto the rake teeth in turning and guiding the rake, and also cause them to be more easily broken, as it would increase the leverage and strain upon them and the upright posts.

X Int. 168. As the Kenaga poles are longer than the Hudson, why is there not a greater liability to break the poles in the Kenaga than in the Hudson, if both are subjected to the same usage?

141 Ans. Because of difference in their connections to the head of the rake and the position of the tongues in the Kenaga rake extending forward, upward, and outward in the process of backing the line of draft and strain on the poles is brought more directly endways in the Kenaga than in the Hudson.

X Int. 169. If you should make the blocks to which the draft poles are attached in the model Acme rake eighteen inches or two feet high it would still be the same rake, would it not?

Ans. I think it would, with the other parts arranged and constructed as shown.

X Int. 170. If you should put some holes in the front ends of the blocks, so that the points of the tongues could be adjusted up and down, that would not make any difference, would it?

Ans. I don't think that would change the construction of the rake materially, provided the other features were retained; but this is not necessary, as the necessary adjustments to the sizes of the various animals to be worked to the rake can be made by lengthening or shortening the breast straps.

X Int. 171. Would a single driver have any difficulty in operating a Kenaga rake sixteen feet wide?

Ans. No, sir; the distance between the horses on all the rakes we make is that distance or more.

X Int. 172. Are not sulky and other wheel horse-rakes, except sweep-rakes, usually operated by one attendant or driver?

Ans. Yes, sir.

142 X Int. 173. You consider that the Acme rake shown in the Acme lithograph is made in accordance with the Kenaga patent, do you not?

Ans. I do, so far as the parts and useful purposes of the elements specified and claimed in the Kenaga patent are concerned, there being only slight and immaterial changes as to construction and arrangement of the wheels. We also make, and find it quite preferable, rakes with the wheels on the end as shown by Kenaga, which will admit of a larger wheel being used than that shown in the Acme lithograph. The rear lifting attachment supported by the third wheel, as shown in the lithograph, is not absolutely necessary in the operation of the rake. That is only a device or attachment provided for raising and carrying the teeth empty when desired or assisting the points of the teeth passing over obstructions when loaded.

X Int. 174. Are the poles of the rake shown in the lithograph jointed or hinged to the rake?

Ans. They are bolted to the rake head similar to those shown in the Acme rake model, with the difference of bolting the rear end of the pole to and through the back cross-piece, as I have heretofore mentioned.

X Int. 175. How much or about how much play or swing do the breast straps have?

Ans. That depends upon the length of the strap; as used by us it is about sixteen to eighteen inches long.

X Int. 176. About how far would they sway outward in backing?

Ans. I should say six to eight inches.

143 X Int. 177. When a skilled mechanic is building a machine to produce a certain result he uses the best proportions known to him for obtaining the desired result, does he not?

Ans. Yes; I think he does, or, at least, he should.

X Int. 178. If you should spread the front ends of the Hudson bars outwards so that such front ends would come outside the axle ends, would that, in your opinion, make the Hudson rake work any better, and supposing, further, that this was done by attaching the poles to the outside of the front standards shown by Hudson?

Ans. This would make but very little difference, as it would only throw the front ends of the bars C outward five or six inches.

X Int. 179. In experimenting with the Hudson machine which you built did you try it with wheels taken from any of your rakes?

Ans. No; I did not. I tried it with the wheels that are on the rake which is here exhibited.

X Int. 180. Are all of the parts produced parts that were used by by you in your rebuilt rake?

Ans. Yes, sir; all the parts here exhibited, except one back and one upright post, which were broken in use.

X Int. 181. How long or about how long did you experiment with that rake?

Ans. An hour or so.

X Int. 182. Is it your understanding that the Kenaga arrangement of the lines is the feature which enables you to operate the rake with one attendant?

144 Ans. I do not. It is the whole construction and combination as described and specified by Kenaga.

X *Ans.* 183. Would it not be a pretty dangerous business to drive over an ordinarily rough meadow with a Kenaga rake and put the horses on a trot?

Ans. Of course, on very rough meadow the teeth would be more liable to catch in the ground than on smooth meadows; but it is not usually the custom to trot horses to rakes of this kind, as they can easily do enough work in a day and be walked to and from the rick or stack in gathering and hauling in the hay. I would like to state that horses are not usually trotted when worked to any kind of farm implement or machine.

By consent of counsel the further taking of testimony is adjourned to Saturday, August 28th, 1886, at nine o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

SATURDAY, *August 28th*, 1886—nine o'clock in the forenoon.

Met pursuant to adjournment.
Present as before.

Redirect examination by J. H. PEIRCE, Esq.:

R. D. Int. 184. What do you mean by stating, in your answer to X Int. 178, that it would make but very little difference if the front ends of the Hudson bars were brought outward by attaching said bars to the outside of the front standards shown in the Hudson rake?

Ans. The necessary distance to which the ends of the poles C should extend outward from the points of the outside end
145 teeth of the rake in order to keep the horses off of the said teeth should be about three feet. An outward extension of six inches would be no perceivable advantage.

R. D. Int. 185. When you speak of the poles extending outward, as in your last answer, from the points of the outside end teeth, do you mean in advance of the teeth or at the side of the teeth?

Ans. I mean laterally outward from the side of the teeth.

R. D. Int. 186. If the head blocks of the Kenaga rake, to which

the poles are attached at their rear ends, were made materially higher than they are in practice—say, so as to be twenty to twenty-four inches, or even more—and the poles were attached to the upper ends of the head blocks thus heightened, you may state whether or not such change in the point of application of the poles would affect the operations of the rake in pulling, backing, or wheeling assuming the front ends of the poles to be retained at the same height as usual for conveniently hitching the horse.

Ans. It would materially affect the operation of the rake in backing the same, by reason of the rear ends of the poles being elevated. This increased distance above the center of the wheels would have the effect of tipping the rake backward, preventing the load of hay from being discharged from the teeth, and it would also increase the liability of breaking off the poles, and their connection to the head block much more than as shown in the Acme rake model, for in this position in the process of backing almost the entire strain is brought to bear lengthways on the timbers of the pole.

146 R. D. Int. 187. This being true, please explain what you meant by stating in answer to X Int. 170 that it would not change the construction of the rake materially if some holes were put in the front ends of the blocks so that the points of the tongues could be adjusted up and down, such question seeming to infer from the previous cross-interrogatory 169 that the blocks were to be eighteen inches or two feet high.

Ans. What I meant by saying that it would not change the construction materially was that simply boring these holes and providing for this adjustment would not change the construction materially, as the holes would not be in the way; neither would they be used in the practical operation of the rake, understanding that the rear connection of the pole would be retained as shown in the model.

R. D. Int. 188. In constructing the "Exhibit Hudson Rake" after the plans of the Hudson patent drawing and specifications you may state what standard of measurement you adopted as a basis in determining the relative size of the various parts.

Ans. From the specifications in the Hudson patent the rake teeth are stated to be about eight feet long. This I took as a standard of measurement for the various parts of the rake, as well as the size and dimensions of the same, except the wheels, which would have been entirely out of proportion for an operative rake, and I used the two wheels obtained from Mr. Hudson, the inventor, which he stated was the proper size and the ones he had used in the construction and operation of the rake that he made.

147 R. D. Int. 189. Assuming the wheel as shown in the Hudson drawing to be made on a scale as of fifteen inches diameter, which I understand to be the diameter of the wheel actually used by Hudson, about how high on such scale as a basis above the end teeth would the front and rear standards extend which are attached to such teeth and serve as supports for the hand bars C?

Ans. The front standard would be fourteen inches and the rear standard ten inches, as near as I can calculate.

R. D. Int. 190. Assuming such front and rear standards to have

been made fourteen and ten inches respectively in height above the end teeth and the hand bars C to be sustained therein, as shown in the Hudson drawing, state whether or not the hand bars thus located could be practically reached and operated from the horses' backs as required by the purposes of said Hudson's invention.

Ans. They could not have been so reached, as it would have brought the bars C to about two feet and two inches of the ground, which would have been impossible to have reached by the operators on the horses without leaning at least half down the horses' sides, which would have prevented them from lifting anything like the amount of weight required.

R. D. Int. 191. About how heavy is a full load of hay on a sweep-rake sixteen feet wide?

Ans. Six to eight hundred pounds.

R. D. Int. 192. State whether or not the location of the bar, which extends across the three front uprights of the Hudson ma-
148 chine to give greater strength to them and to prevent the hay slipping back over the prongs, is anywise dependent for such purposes upon its position directly above the rim of the wheel, as shown in figure 2 of the Hudson drawing, such wheel it appearing having been made disproportionately by the draftsman.

Ans. To locate the bar as shown in the drawing, figure 2 of the Hudson patent, as high up as to clear the rim of the wheel it would not serve the purpose of preventing the hay from working back over the head of the rake, as it would be located as I have located it in the construction of the Hudson rake. The location of the bar for the purposes set forth in the Hudson patent could not be located with reference to the rim of the wheel and serve the two purposes mentioned—that is, preventing the hay from working back toward the head of the rake and at the same time give requisite strength to the forward upright posts.

R. D. Int. 193. Has the rim of the wheel anything to do with determining the location of the cross-brace bar for the purposes for which it is designed?

Ans. It has not.

R. D. Int. 194. Suppose a rake pole were to be extended laterally from the front standards of the Hudson Rake Exhibit, so as to give the horse plenty of side play when hitched to the front thereof, the horse being hitched at the back to draft bars, as shown in the Acme rake model, state whether or not such rake could be employed practically in the operation of backing to discharge the load.

Ans. It could not be so operated.

149 R. D. Int. 195. Why not?

Ans. For the reasons I have heretofore stated. Owing to the distance of the location of the rear ends of these bars C above the center of the axle, — forms a leverage which would have the effect to tip the rake directly backwards in the effort of backing, and prevent the hay from being discharged from the teeth, and would also increase liability of breaking the bars C, as in this position the strain would be almost directly sideways with the bars C, and cause them

to break more easily than if located at or near the center of the axle of the rake.

R. D. Int. 196. Please state whether if horses were hitched solely to the front ends of the pole of a rake, like Acme rake model, with no connection to the draft bars or other part about the rake head, the rake could be wheeled or operated.

Ans. It could not be successfully operated for the purpose for which it is intended.

R. D. Int. 197. State whether or not the draft bars, as shown in the Acme rake model, have anything to do with the operation of turning the rake.

Ans. They do. The draft bar and the pole C being fastened to the rake head and the extreme ends of each being kept in the same position with relation to each other laterally when the draft is brought upon the draft bar, the effect is to move the ends of the poles to which the horses are attached at the same time, and it is both the draft bar and the pole C combined which aids in turning and guiding the rake.

R. D. Int. 198. In your answer to X Int. 132 you state that
150 if the proper harness could be devised to hitch a horse to the extreme ends of these tongues or poles that they would be strong enough to turn a rake, but this would be entirely unnecessary or advisable in properly operating the rake. Will you please explain what you mean by saying "unnecessary or advisable"?

Ans. I meant in answering to say not necessary or advisable to so hitch the horses to the rake, and I intended to answer the question whether or not the poles C would be strong enough when the horses were hitched to the extreme end to bear the weight of turning the rake, but I did not mean to convey the idea that it was at all practical to so hitch the horses and operate the rake in that way.

R. D. Int. 199. In expressing your opinion as to the operativeness of the Wicks rake, as stated in answer to X interrogatory 121, what, if any, dimensions of such rake did you have in mind?

Ans. I had in mind a rake fourteen to sixteen feet wide, with teeth similar to those shown in the "Exhibit Hudson Rake."

R. D. Int. 200. State whether or not you had the same understanding in expressing the opinion set out in answer to X Int. 119.

Ans. I had the same-sized rake in mind in answer to X Int. 119 that I had in mind in answering X Int. 121.

R. D. Int. 201. You may state what disadvantages, if any, would arise in the operation of the rake if you took the same rake that Kenaga took to use with his tongue, and applied thereto, instead of such tongues, the poles shown in the Currier patent parallel to each other and in line over the outer teeth, assuming the poles to
151 extend directly backward horizontally, as in the Hudson Exhibit, and in the second instance assuming the poles to extend downward near to the axle, as in the Kenaga device.

Question objected to for the reason that the witness has been over this ground fully.

Ans. If the poles were arranged in both instances you have men-

tioned, relative to the head of the rake, with their forward ends extending parallel above the teeth and the draft bars extending outward from the head of the rake, as shown in the Kenaga device, for properly hitching the horse for draft and properly hitching him forward to these poles for backing, would put the horse in a diagonal position relative to the line of draft, and thus prevent him from walking directly forward and on a line parallel with the rake teeth. With the horses thus hitched they would step first onto the rake teeth and be in no position to be driven to operate the rake. The bars or tongues would also be much more liable to break, as heretofore explained by me, and with the poles arranged at the top of the front posts, as in the Hudson rake, the effect would be also to tip the rake backward and prevent the discharge of the load of hay, which facts I have already pointed out.

JOHN E. KIRK.

152 United States Circuit Court, Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Equity.

Depositions of witnesses taken on behalf of the complainant, by consent of counsel for both parties, before Geo. T. Page, a notary public acting as special commissioner, at the National Hotel, Peoria, Illinois, commencing at 10 o'clock a. m., September 16th, 1886, the examination being conducted on oral interrogatories, under the 67th rule, as amended, formal notice in writing as to the time, place, and person by whom the depositions were taken being waived.

Present: J. H. Peirce, Esq., in behalf of the complainant; L. L. Bond, Esq., in behalf of the defendants.

Whereupon the following proceedings were had:

CHARLES H. CRONE, a witness called in behalf of the complainant, being first duly sworn, deposes in answer to interrogatories propounded by J. H. PEIRCE, Esq., counsel for complainant, as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. Charles H. Crone; age, 29; Peoria, Illinois; salesman of agricultural implements.

Int. 2. Have you ever been salesman for the Acme Hay Harvester Co., the complainant in this cause?

A. Yes, sir.

153 Int. 3. How long were you such salesman?

Ans. From May 7th, 1883, up to May the 15th, 1886, and off and on since then.

Int. 4. What did you sell for that company during the time you were so employed by it?

Ans. The Acme hay-ricker loader and rakes.

Int. 5. Was the Acme Company in existence when you first began to sell hay-rakes?

Ans. No, sir.

Int. 6. For whom did you sell the first hay-rakes?

Ans. John E. Kirk.

Int. 7. When was it that you first began to sell hay-rakes for him?

Ans. May 7, 1883.

Int. 8. How long did you continue to sell the same for him?

Ans. Until the firm was changed to the Acme Hay Harvester Co.

Int. 9. And did you then continue with that Acme Company in the sale of rakes until May of 1886?

Ans. Yes, sir.

Int. 10. When you first began to sell hay-rakes for Mr. Kirk, describe what kind of hay-rake it was which you sold.

Ans. It was a rake of about 12½ foot sweep, teeth about 8 feet long—wooden teeth—with draft bars for hitching to, and tongues at either end, with a seat setting on the centre of the main frame of the rake, and wheels.

Int. 11. Examine the Exhibit "Acme Lithograph No. 2" and state how, if at all, the rake there shown differs in its structure and the arrangement of its parts from the rake just described as having been first sold by you for Mr. Kirk.

Ans. It's just the same.

154 Int. 12. How long did you continue in the sale of such rakes?

Ans. Up to August 1st, 1886.

Int. 13. Examine the Exhibit Acme Lithograph and state whether you have ever sold the rakes such as are shown therein.

Ans. Yes, sir.

Int. 14. When did you first sell such rakes and for whom?

Ans. From the time of its first invention, for the season of 1886—that is, the fall and winter of 1885. I sold them for the Acme Hay Harvester Co.

Int. 15. State how, if at all, the arrangement of draft bar and poles at the sides of the rake to which the horses are hitched differ in the Exhibit "Acme Lithograph" from what is shown in the Exhibit "Acme Lithograph No. 2."

Ans. It is just the same, and has been.

Int. 16. About how many rakes having the poles and draft bars attached thereto as shown in said exhibits have you sold?

Ans. All that I ever did sell have been of that construction. Probably ten or twelve hundred rakes.

Int. 17. In what States have you sold such rakes?

Ans. Illinois, Indiana, Kentucky, Missouri, Iowa, Nebraska, Dakota.

Int. 18. Have you ever practically used such rakes in raking hay in the field?

Ans. Yes, sir.

Int. 19. Under what circumstances have you thus used the rakes?

Ans. In setting them up and starting them for farmers
155 that have purchased them, and working them at State fairs as an exhibition.

Int. 20. State whether or not, during your use of such rakes, you have ever had occasion, in hitching the horses thereto, to arrange cross check-lines running from horse to horse, as in the usual way with a team, for managing and guiding the same.

Ans. No, sir.

Int. 21. Are such cross check-lines not necessary?

Ans. They are not only not necessary but they are useless.

Int. 22. In your experience in exhibiting such rakes state whether or not you found that the farmer believed, ordinarily, that such check-lines were so unnecessary and useless.

Ans. No, sir.

Int. 23. You may mention some instances in your experience tending to show the views of various persons in respect to the probable need of cross check-lines running between the horses for the proper management thereof in driving the rake.

Objected to by L. L. Bond for the reason that it calls for secondary evidence.

Ans. In one instance, at the Minnesota State fair, in 1885. We had a complete machine on exhibition, to be worked with horses and hay; not being able to get a team of farm horses, secured a team of city truck horses, and when about to hitch them to the rake the owner of the horses and farmers that were standing near remarked that we would be dandies if we drove that team to the rake the way I was hitching them up, and, after they were driven
156 about for an hour and a half, the remark was made by many that they would bet money that we brought the team with us already trained for the rake, and it very much surprised the driver and the owner of the horses that his team would work so naturally.

In another instance I started a machine on the farm of G. C. McFerrin, of Louisville, Ky.; he is one of the largest breeders of trotting horses in this country. He sent to the field mules, and negroes for drivers, and when ready to hitch the team to the rake McFerrin asked the question "if we was going to control those mules by driving them as far apart as that and without any cross check-lines," and was about to dictate to me a different arrangement from what I was doing in regard to driving them—that is, he wanted cross check-lines; he thought it was necessary, and he was very much surprised and pleased to see the way the darkies managed the teams with our own mode of hitching.

There is another occurrence: Mr. Coulson, of Illinois, near Joliet, purchased a machine at Des Moines this season, 1886, which I started in the field. He hired a neighbor and team, and none of the parties or their horses had ever worked with any machine of that kind. When hitching the horses to the rake the owner of them thought it

was very absurd to attempt to drive his team in that manner, but after an hour's work with it convinced him that such a thing was possible, and to the surprise ofthem all.

I don't just now happen to think of other instances, though there have been many of them, just the same.

At all four exhibitions at State fairs, and at times where starting machines for farmers, it is a very common remark among first ob-
157 servers to call it absurd to hitch in that way, the regular order of our hitching, and then, after the team has had an hour or so training or driving to the rake, it is a more common remark to hear them say that the team has been trained or driven in that way before.

Int. 24. State whether or not, according to your general experience, the cross hitching of the team in the rake was deemed essential by persons familiar with the management of teams, but who had no knowledge of the operation of these pole-rakes.

Ans. Yes, sir; it was.

Int. 25. And did they so express themselves?

Ans. Yes, sir.

Int. 26. State whether or not you have seen pole-rakes used in which the poles were not hitched to the horses at the front.

Ans. Yes, sir.

Int. 27. Please state the circumstances.

Ans. It was very often the case with farmers in Kentucky, when they had no expert to help them in starting a machine, that they would hitch a mule to each draft bar and put a young nigger on each horse to ride, and then when I would go out and propose changing the arrangement I always found it difficult to convince them of successfully working it my way until I had proven it to them; and I never failed to have them adopt our mode of controlling the team with one driver.

Int. 28. Examine the rake shown in "Acme lithograph No. 2" and describe from it how the horses are hitched to the rake so as to be brought within the control of a single driver.

Ans. One horse hitched at single-tree attached at outer end of draft bar on each end of the rake, then are tied to end of pole by
158 hitching straps; breast strap is also fastened to same, then a rein from each horse checked to each side of the bit, so that in pulling on the rein you pull back evenly on each side of the bit. I always recommended harness breeching, but it is not absolutely necessary,

Int. 29. State whether or not the plan of hitching you have just described and as shown in said exhibit drawing is the customary one in hitching the team to the pole-rake.

Ans. Yes, sir; it is.

Int. 30. You may say whether or not the hitching from the horse's bit to the adjoining pole is an essential in securing the proper operation of the horse.

Ans. It is in almost every instance.

Int. 31. Suppose such hitching strap were omitted, state whether

or not the rake could still be driven and the horses managed in the ordinary operations of raking hay.

Ans. Yes, sir; it could.

Int. 32. State whether or not such hitching straps are so frequently omitted in practice.

Ans. Yes, sir; they are frequently omitted.

Int. 33. Please explain then what you meant by stating that such hitching straps were essential.

Ans. In first hitching the horses to the rake the position is new to them, and if the horses are at all inclined to be nervous the hitch strap attached to the end of the pole is some security from breaking the pole by the horse pulling sideways with the breast strap.

Int. 34. You may say whether or not, after the horses become accustomed to the new position, such hitching strap is of any particular use.

Ans. It is not.

159 Int. 35. What, if anything, then serves to guide the horse with the hitching strap omitted?

Ans. The reins.

Int. 36. Do the reins not serve in such way from the very outset for managing and guiding?

Ans. They do very much.

Int. 37. What, if anything, do the poles do in guiding and wheeling the team?

Ans. Nothing at all.

Int. 38. Look at the rake shown in the Exhibit "Acme Lithograph No. 2" and, assuming the rake be wheeled to the left, state how, if at all, the poles act to guide the direction of the horses during the wheeling movement, turning to the left.

Objected to by L. L. Bond because the witness has just stated that it don't do anything.

Ans. The horse at the left end of the rake is held back by the driver, which holds that end of the rake from going forward by means of the breast strap attached to the end of the pole. The horse at the right end of the rake is driven forward, which turns the rake to the left.

Int. 39. State whether or not, during the turning movement, the horse on the left will be touched by the adjoining pole.

Ans. He would be if he did not step to the left, which he is sure to do after an hour or two of practice on the rake.

Int. 40. What, if anything, has occurred in the hour or so of practice which causes the horse to turn without the touch of the pole against him?

Ans. He has learned in that time that he is to step to one side or the other, in accordance with the movements of the tongue.

160 Int. 41. What would happen to the horse if he did not so step aside?

Ans. He would get hit with the tongue.

Int. 42. Then I understand that the tongue does serve in teaching him to wheel or, rather, turn in his tracks?

Ans. Yes, sir.

Cross-examination:

X Int. 43. Did all of the rakes sold for the season of 1886 have the wheels set in under the rake head, as shown in the "Acme lithograph?"

Ans. Yes, sir.

X Int. 44. Do you know of any Acme hay-harvester rakes being sold which had their supporting wheels at the outer ends of the rake head?

Ans. I do not.

X Q. Int. 45. You have exhibited one or more rakes with wheels at the ends of the rake heads, have you not, this year?

Ans. Have exhibited such a rake on one occasion.

X Q. Int. 46. What was the diameter of the wheels on that rake?

Ans. I think 24 inches.

X Q. Int. 47. In making sales over the territory named by you, you was travelling salesman for the Acme Hay Harvesting Co., was you not?

Ans. Yes, sir.

X Q. Int. 48. Were your sales usually to what is known as the trade or to farmers direct?

Ans. To the trade and, indirectly, to farmers.

X Q. Int. 49. When the parties in Kentucky used the pole-
161 rakes with riders without hitching the horses to the ends of the poles they could do good raking, could they not, even though that was not the best way to handle the rake?

Ans. Well, not on an average they could not.

X Int. 50. They could make it work in that way, could they not?

Ans. They could make it work, but not at all times satisfactory.

X Int. 51. Which way would be most liable to break poles—that is, hitching or not hitching to the end of the poles with the breast strap?

Ans. To hitch without a breast strap.

X Int. 52. Why?

Ans. If a horse is inclined to be nervous or balky and in pulling sideways from the tongue he would be apt to pull harder on a breast strap than he would from a strap attached to the bit.

X Int. 53. I don't think you quite understand me. What I meant to ask was: In which way the team would be most liable to break tongues—if they were hitched by breast straps to the tongues or not hitched to them in any manner? With this understanding, please answer.

Ans. Well, it would depend on the horse. If he is nervous and not familiar with the position he would be more apt to break the tongue while hitched to it, and if not attached to it he would be very apt to keep out of the way of it and would have no other way of breaking them than by crowding or throwing himself against it.

X Int. 54. Are the poles of the "Acme rake" strong enough to be used as the sole means of turning the rake?

162 Ans. Yes, sir.

X Int. 55. If you had a load on the rake do you think either horse could turn it by the breast strap and pole by pulling sideways on the strap?

Question objected to, it not appearing whether the horses are to be hitched to the draft bars in addition to the hitch to the poles or not, and, further, whether the horse is to move from or toward the body of the rake in turning.

Ans. I don't think it could—a big load.

X Int. 56. In the ordinary hitching of horses to one of these pole rakes do you use both hitching strap and breast strap, as shown in the "Exhibit Acme Lithograph No. 2"?

Ans. I generally do.

X Int. 57. In fixing the lines do you so arrange them by splitting them down or doubling them so that the driver will have two lines for each horse?

Ans. No, sir.

X Int. 58. If you was directed to have "the reins split back to a point in convenient reach he (the driver) will be able to back one horse or otherwise manage him independently of the other" would you not understand that you was to double or split the reins so that there would be two to each horse?

Ans. No; I don't think I would.

X Int. 59. If you attempted to follow the direction quoted in the last question how would you fix them?

163 Ans. I would have one rein from each horse checked on either side of the bit and arranging the two parts of each rein to come together in convenient reach of the driver.

X Int. 60. Do you mean by two parts the two ends of an ordinary pair of lines?

Ans. The same, only the ends extended.

X Int. 61. Extended is not splitting, is it?

Ans. No, sir; it is not.

X Int. 62. The arrangement of the lines as given in the directions of the Kenaga patent would practically give two single lines for each horse, would it not?

Ans. They would be such to a point in convenient reach of the driver.

X Int. 63. Is the breaking of poles or rake teeth a very common accident or occurrence?

Ans. They are not infrequent.

X Int. 64. Is the breaking of the teeth of the pitcher fork a very frequent occurrence?

Ans. They break occasionally, but not frequently.

X Int. 65. How are poles most frequently broken?

Ans. More in the case of spirited horses and poor drivers and not being hitched properly.

Redirect examination:

R. D. Int. 66. If you had two single lines—one hitched to each bit at either side of the horses' heads and running thence directly back to the driver's hand so that the draft or bearing was equal on both sides of the bit—state whether or not the driver, having thus four single lines in his hands, two running to each horse, could manage and guide the pole-rake team the same as if the bit lines were joined together at the back strap and continued thence by a single line to the driver's hand, as shown in the "Acme lithograph No. 2."

164 Ans. There would be no difference in the management in either case.

Recross-examination:

R. C. Int. 67. As shown in the "Acme lithograph No. 2," the inside lines are hitched to the draft poles, are they not; and the outside lines are the only ones that come to the driver, are they not?

Ans. The strap running from the bit to the pole, as shown in the lithograph, is the hitch strap, and the lines being joined on the back near the back strap and then run from this point to the bit of the horse with the split rein on either side of the horse's neck, as is more clearly shown in the Exhibit "Acme Lithograph."

CHARLES H. CRONE.

OSCAR A. HALE, a witness called in behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. H. PEIRCE, counsel for complainant, as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. Oscar A. Hale; age, 58; residence, Richwoods township, Peoria county, Illinois; occupation, farmer and dairyman.

Int 2. How long have you been a farmer?

Ans. Twenty-four years.

Int. 3. Have you ever had occasion to use drag-rakes of any kind for the purpose of raking hay?

Ans. Yes, sir.

Int. 4. When did you first use such rakes?

Ans. In 1882.

165 Int. 5. From whom did you buy that rake?

Ans. I bought it of John E. Kirk, of the Acme Hay Harvester Company, the complainant.

Int. 6. Please explain briefly what the construction of that rake was.

Ans. It was about fourteen feet wide, I think; rake teeth eight feet long—about; draft bar on each end about six feet long, with single-trees on outer end.

Int. 7. How were the horses hitched and managed on such rakes?

Ans. They were hitched to the single-trees, one on each side, and a boy to ride each horse. There were two boys.

Int. 8. If such rake were traveling forward with its load state how

you managed the horses in order to move the rake backward or in an opposite direction from that in which it had been traveling.

Ans. I turned the horses right square around.

Int. 9. State whether or not the horses were hitched in any way at the front to the rake.

Ans. They were not.

Int. 10. How long did you use that rake?

Ans. One season; one year.

Int. 11. How much hay, about, did you rake with it?

Ans. About one hundred and fifty tons.

Int. 12. What kind of a rake, if any, did you next use after the drag-rake you have mentioned?

Ans. The same rake with two poles or tongues and two cast-iron wheels.

Int. 13. State how the poles or tongues were used on that rake.

Ans. They were on each side of the rake. The breast strap
166 of the harness was fastened to the end of the tongue, so that they could back the rake without turning around.

Int. 14. When did you first use a rake having the poles or tongues as you have mentioned?

Ans. In 1883.

Int. 15. State whether or not you have used such kind of rake with projecting poles thereon ever since.

Ans. I have.

Int. 16. What led you to use the poles and wheels in conjunction with the old drag-rake as you have stated?

Ans. I used it on Mr. Kirk's recommendation—Mr. John E. Kirk. He explained it to me, and I thought it would be a good thing.

Int. 17. You may state whether or not the rake so changed by the use of poles has proven to be of any advantage over the plain drag-rake you first used.

Ans. It has.

Int. 18. How much of an advantage in the day's run do you think it to be?

Ans. Well, about one-third saving in good ground—that is, we can put up one-third more hay and save one boy. In rough ground we can save at least one-half.

Counsel for complainant offers in evidence a drawing, which is marked "Complainant's Exhibit Acme Lithograph No. 2."

Int. 19. Refer to the Exhibit "Acme Lithograph No. 2" now shown you and state how, if at all, the rake there shown differed from the pole-rake into which your drag-rake was converted on the recommendation of Mr. Kirk.

Ans. All the difference is in two small braces (witness here points to the braces crossing the rake head beneath the draft bar).

Int. 20. State whether or not you have used the rake as changed ever since the season of 1883.

167 Ans. I have.

Int. 21. State, as nearly as you can, how much hay during each season, beginning with 1883, you have raked with it.

Ans. In 1883 I raked about one hundred and forty tons, and in 1884 about the same—one hundred and forty tons; in 1885 and 1886 about one hundred tons each.

Int. 22. In the use of the rake like that shown in the Exhibit "Acme Lithograph No. 2" state whether or not cross-hitches or check-lines, as commonly employed in managing a team of horses hitched to a pole, are necessary.

Ans. No, sir; they can't be used.

Int. 23. Did you at any time think that such check-lines were necessary in the management of a team hitched to this pole-rake?

Ans. I did until I got hitched up and found they could not be used on account of catching in the hay. I could not drive upon the stacker head.

Int. 24. When was it you found that the cross-hitches could not be used?

Ans. In 1883.

Int. 25. Was it when you first tried to use the rake in its changed condition?

Ans. It was.

Int. 26. Had you ever seen one of these pole-rakes with the horses hitched thereto prior to that time?

Ans. No, sir; I never did.

Cross-examination by L. L. BOND:

X Int. 27. The rake which you used in 1882 was the same rake which was fixed over and afterwards used by you, was it not?

168 Ans. It was.

X Int. 28. What kind of wheels were taken off from it when the cast-iron wheels were put on?

Ans. There were no wheels taken off, but there were two cast-iron drags to raise the rake head off the ground.

X Int. 29. How and where were those drags applied?

Ans. About in the same place as where wheels are shown to be on the rake in "Acme lithograph No. 2."

X Int. 30. Were what you have called drags sometimes called runners?

Ans. Yes, sir.

X Int. 31. They differed from ordinary runners, like sled runners, in being rounded at both ends, did they not?

Ans. Yes, sir.

X Int. 32. Did the application of wheels in the place of these runners change the elevation of the rake head; if so, to what extent?

Ans. I think it did not. I did not notice any difference. I never measured.

X Int. 33. When you speak of raking one-third or one-half more do you mean that you raked three tons where you had raked two before and two where you had raked one before?

Ans. I do.

X Int. 34. What acreage did you have in meadow in 1882 and how much time did you occupy in gathering the hay?

Ans. I had about one hundred acres. I was two weeks, as nearly as I can tell. I think I commenced on Saturday cutting, and two weeks from that day I finished—on Saturday night.

169 X Int. 35. How much of this time was occupied in cutting and curing the hay and how much in raking it?

Ans. I don't believe I can answer that, because I don't know. It rained some days in the meantime, and I worked at it whenever I could, both cutting and raking.

X Int. 36. Did you use the same machinery for stacking and ricking the hay in 1882 as in 1883 and afterwards?

Ans. I did; excepting the tongues on the rake.

X Int. 37. What acreage did you have in meadow land for each of the years 1883, '4, '5, and '6?

Ans. About one hundred acres each year in 1883 & '4; in 1885, about 120 acres; in 1886, about 140 acres.

X Int. 38. How much or about how much time did it take to harvest the hay crop in each of these years?

Ans. About three weeks.

X Int. 39. Are you able to state the exact or proximate part of this time that was used in actual raking of the hay? If so, state it as compared with the time used in cutting and curing the hay.

Ans. About two-thirds of the time.

X Int. 40. Please explain how this is so.

Ans. We commence at eight o'clock; work till twelve o'clock; then commence about four and work till about sundown; this is using the rake. We begin cutting as soon as we can get up, about five o'clock in the morning, and cut till twelve o'clock and begin again between one o'clock and two and cut until seven o'clock in the evening.

X Int. 41. How many mowing machines and how many rakes do you use?

Ans. One of each.

X Int. 42. Can you drive the team any faster with the rake as you had it in 1883 than you could with the rake as you had it in 1882?

170 Ans. No, sir.

X Int. 43. As your rake was in 1883 and has been since could you raise the front ends of the teeth off from the ground when traveling either to or from the stack or other place for unloading the rake?

Ans. No, sir.

X Int. 44. How much more liable were the teeth to be caught or seriously obstructed in the rake as you had it in 1882 than they were in 1883 and afterwards?

Ans. Well, a good deal more.

X Int. 45. How do you account for the difference?

Ans. Well, a boy sitting on the hind end of the rake can see a ditch or any raise or obstruction much easier than he can when on horseback at the front of the rake.

Redirect by J. H. PEIRCE:

R. D. Int. 46. Please explain how it is that the rake with poles attached, as shown in "Acme lithograph No. 2," can do so much more work than the drag-rake as used by you in 1882.

Ans. Well, in raking hay when anything gets on the points of the teeth or it runs against an obstruction you can back out much quicker, and you can rake around ravines in less than half the time you can with a drag-rake, and you can drive on the stacker head and back out in half the time you can with a drag-rake.

In turning around with the drag-rake one boy drives faster than another and the rake gets caught and breaks off the teeth, and you have to stop and put in teeth.

R. D. Int. 47. What help, if any, are the hitching poles, as shown in the "Acme lithograph No. 2," in accomplishing the benefits which you have just mentioned?

171 Ans. It is because we can back the horses much better and the horses go much better with the poles than without them.

OSCAR A. HALE.

NELSON S. JOHNSON, a witness called in behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. H. PEIRCE, counsel for complainant, as follows:

Int. 1. State your name, age, place of residence, and occupation.

Ans. Nelson S. Johnson; age, 37; residence, Canton, Illinois. I am a farmer and stock-raiser. I was in the implement trade in 1882 and 1883.

Int. 2. What kind of implements did you sell during those years?

Ans. Plows, harrows, threshing machines, hay-stackers, etc.

Int. 3. From whom did you buy the hay-stackers?

Ans. John E. Kirk, now president for the Acme Hay Harvesting Co.

Int. 4. Did Mr. Kirk sell you any hay-rakes during those years?

Ans. Yes, sir.

Int. 5. What kind of rakes did he first sell you?

Ans. The old-fashioned slide-rake.

Int. 6. When did he sell you those?

Ans. Season of 1882.

Int. 7. Did he sell you any other kind of rakes during that season?

Ans. No, sir; I think —.

Int. 8. About how many of the old slide rakes did he sell you?

172 Ans. Eighty.

Int. 9. Please explain briefly how such slide-rakes were made and used.

Ans. I think they were twelve feet long, with cross-pieces studded with eight-foot teeth, with an arm or lever—draft arm—at each end to which the horses were attached. They were operated by two men—or boys—going into the field, filling the rake with hay, and hauling on to stacker, then turning horses around, drawing the rake from the hay, leaving the hay on the stacker.

Int. 10. How were two men or boys employed in operating this slide-rake, as you have stated?

Ans. By managing the horse, one man or boy at each end of the rake.

Int. 11. Did you sell these slide-rakes during the next season of 1883?

Ans. No, sir; I sold them improved.

Int. 12. How were they improved?

Ans. By tongue or pole, and, I believe, wheels instead of runners.

Int. 13. Explain how the tongue or pole was applied to the rake.

A. By being bolted to each end of the rake at such an angle as would be convenient to hitch a pole strap to.

Int. 14. Please examine the rake shown in the Exhibit "Acme Lithograph No. 2," and state how, if at all, the rake there shown differs from what was sold by you during the year 1883.

Ans. I can't see any difference at all.

Int. 15. Are the draft poles to which the horses are hitched, as shown in the "Acme lithograph," the same kind of poles as were on the rakes sold by you during 1883?

173 Ans. I think they are.

Int. 16. From whom did you buy the rakes sold during that season?

Ans. John E. Kirk, Peoria, Illinois.

Int. 17. What reason, if any, had you for changing from the old slide-rake sold during 1882 to the pole-rake sold during 1883?

Ans. I believed them to be much better with the improvements.

Int. 18. State whether or not, to your knowledge, anything has been done with the slide-rakes, as sold during 1882, to change the same to the pole-rakes like that shown in the "Acme lithograph No. 2."

Ans. They have all been changed, so far as I know, to the rake as shown in this cut. (Witness points to the "Acme lithograph No. 2.")

Int. 19. State whether or not, in your experience, the buyer or user of the pole-rake like that in the cut believed cross check-lines necessary for the management of the horses.

Ans. Yes, sir, they did; and I might add that they did not know whether they could be handled that distance apart or not, even with them, until after trial.

Int. 20. What distance apart were the horses to be?

Ans. I should think 16 or 18 feet.

Int. 21. State whether or not there is any material advantage in the use of the pole-rake as sold by you during 1883 over the slide-rake sold during 1882.

Ans. Yes, sir; there is a decided advantage.

Int. 22. You may mention briefly in what respect.

Ans. One man or boy of the same ability would handle the rake with more ease and speed than two men or boys could the rake as sold in 1882.

174 Cross-examination by L. L. BOND:

X Int. 23. Mr. Kirk quit making the style of rake which you

handled in 1882, did he not, so that you could not have obtained the slide-rake of him if you had wanted them?

Ans. I don't know as to whether he had quit the manufacture of the slide-rake or not. I know that he had them for sale.

X Int. 24. Did he not recommend the change from the 1882 to the 1883 kind?

Ans. He did.

X Int. 25. Was not the changing from runners to wheels an important improvement?

Ans. It was.

Redirect:

R. D. Int. 26. Would you have made the change to the rake of 1883 unless you believed that such rake was an improvement?

Ans. No, sir.

R. D. Int. 27. What was the selling price between the rake of 1882 and 1883?

Ans. Not any. I bought and sold at the same price.

NELSON S. JOHNSON.

NATHANIEL T. PATTON, a witness called in behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. H. PEIRCE, counsel for complainant, as follows:

Int. 1. State your name, age, place of residence, and occupation.

Ans. Nathaniel T. Patton; age, 54; residence, Monmouth, Illinois; I am selling agricultural implements in their season.

175 Int. 2. When, if ever, did you first sell drag or slide hay-rakes?

Ans. In 1882.

Int. 3. About how long were the teeth of such rakes and how wide across were the rakes?

Ans. The teeth were about 8 feet long and the rake about 13 feet across.

Int. 4. In what manner were the horses hitched and managed in such rakes?

Ans. The horses were hitched to a drag arm, one horse at each end, with a boy or man to ride or lead the horses.

Int. 5. Did one man or boy serve for both horses?

Ans. No; one for each.

Int. 6. How long did you continue the sale of such drag-rakes?

Ans. I sold a few of them in 1883.

Int. 7. Did you sell any of the same afterwards?

Ans. No, sir.

Int. 8. What kind of rake, if any, other than this drag-rake of 1882 have you since sold?

Ans. We have sold the rake with the improvements, with tongues, wheels, and seat.

Int. 9. State how, if at all, the rake thus improved differed in its construction from the rake with tongues, wheels, and seat applied thereto, as shown in the Exhibit "Acme Lithograph No. 2."

Ans. The pole attached to each end, with wheels in place of the slides.

Int. 10. Did you ever sell rakes like that shown in the Exhibit "Acme Lithograph No. 2"?

Ans. Yes, sir.

Int. 11. When did you first sell them?

176 Ans. In 1883.

Int. 12. The additions of the hitching poles, the wheels instead of the runners, and the seat, when applied to the rake of 1882, made a rake like or unlike the rake shown in the "Acme lithograph No. 2"?

Ans. Very much like it.

Int. 13. How, if at all, did it differ therefrom?

Ans. The cross-pieces were a little closer (pointing to the cross-pieces in the picture shown on the "Acme lithograph No. 2").

Int. 14. Was there any other material difference?

Ans. No, sir.

Int. 15. State whether or not you have continued to sell these pole-rakes during each season since you first began the sale thereof, in 1883.

Ans. Yes, sir.

Int. 16. Do such pole-rakes have any advantages in use over the slide-rakes you sold in 1882?

Ans. They do.

Int. 17. You may state briefly what they are.

Ans. They can be managed by one hand less and are speedier.

Int. 18. State whether or not the usual cross check-lines, as employed in managing a team by a single driver, are necessary for the control or guidance of the horses hitched to the poles of the rake like that shown in the "Acme lithograph No. 2."

Ans. No, sir; they are not.

Int. 19. State whether or not, in your experience, the buyer or user of such rake believed at the outset that such check-lines must be employed.

177 Ans. Some thought it would be necessary to use check-reins and some thought it could be managed without.

Int. 20. Those who thought the team could be managed without the check-lines, had they any prior information tending to induce such belief?

Objected to by L. L. Bond for the reason that it calls for what is impossible for the witness.

Question withdrawn by J. H. Peirce.

Int. 21. From whom did you buy the improved or pole rakes?

Ans. I bought them of John E. Kirk, in 1883; of the "Acme Hay Harvester Co." since.

Int. 22. Were there any printed instructions as to the mode of hitching the horses to the pole-rake during the year 1883?

Ans. Yes.

Int. 23. Did such instructions require that the horses should be joined by cross check-reins?

Objected to by L. L. Bond for the reason that the printed instructions are the best evidence, and no foundation has been laid for the introduction of secondary evidence.

Ans. No, sir.

Int. 24. How wide across were the pole-rakes sold by you in 1883?

Ans. They were 12 or 13 feet across.

Int. 25. Did the printed instructions accompanying the pole-rakes in 1883 have any views showing the horses as hitched to such rake?

Same objection as above continued.

Ans. Yes, sir.

178 Int. 26. How, if at all, did such view or cut differ from the view of the pole-rake with horses attached, as shown in "Acme lithograph No. 2"?

Same objection continued; and the further objection that this testimony is not in rebuttal.

Counsel for complainant offers to produce the printed instructions referred to, which are not now present.

Ans. There was no difference except in size.

Int. 27. State, if you know, whether any of the old drag-rakes sold by you during 1882 and 1883 have been changed into such pole-rakes as you have described.

Ans. Yes, sir; there have.

Int. 28. About how many, as near as you can estimate?

Ans. All that we have sold that I can think of now.

Int. 29. State what, if any, difference there was in selling price between the old drag-rake and the new pole-rake?

Ans. Five dollars a rake higher for the pole-rake.

Cross-examination by L. L. Bond:

X Int. 30. You obtained the pole-rakes from the factory for the same price that you paid for the drag-rakes, did you not?

Ans. My recollection is not.

X Int. 31. What was the difference in price at the factory?

Ans. I think the list-price difference was $15.00 on two rakes; that is my recollection now, for 1883.

X Int. 32. What do you mean by two rakes?

Ans. A ricker and two rakes constituted a machine complete as we sold them.

X Int. 33. At whose expense were the drag-rakes changed to pole-rakes?

179 Ans. At the expense of the owner of the rake.

X Int. 34. Did the owners of these drag-rakes bring them in of their own motion to be changed?

Ans. Some would bring them in, others took the attachments out and attached them to the rakes themselves.

X Int. 35. How long did it take to change all the drag-rakes which you sold, or when was the last one changed?

Ans. The last one was changed in the summer of 1886.

X Int. 36. Did you send your customers who had these drag-rakes

any written or printed matter advising them upon what terms or conditions their rakes could be changed?

Ans. No, sir.

X Int. 37. How do you account for it that the owners all had them changed if they did not know that it could be done on favorable terms?

Ans. By hearing from using the wheel-rakes the advantages over the slide-rakes.

X Int. 38. Dealers in agricultural implements are obliged to take such machines as the manufacturers make, are they not?

Ans. Not always.

X Int. 39. What do they do when they cannot get them from the manufacturers?

Ans. Do without, I think.

X Int. 40. Is it not the fact that the sale of machines follows the changes introduced by the manufacturers, and that when the manufacturers change stock it is almost impossible to sell the old machines, as a general thing?

Ans. Generally, it is.

180 X Int. 41. The addition of a seat and wheels to the old drag-rake were improvements, as well as the addition of poles, were they not?

Ans. Yes, sir.

Redirect:

R. D. Int. 42. Do you know of any pole-rake having been changed back to a drag-rake after it had been used?

Ans. No, sir.

NATHANIEL T. PATTON.

BERNARD HESSLING, a witness called in behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. H. PEIRCE, counsel for complainant, as follows:

Int. 1. State your name, age, place of residence, and occupation.

Ans. Bernard Hessling; age, 59; I reside in Richwood's township, Peoria county. I am a farmer.

Int. 2. How long have you been farming?

Ans. Nearly 30 years.

Int. 3. Look at the rake shown in the Exhibit "Acme Lithograph No. 2" and state whether you have ever used a rake of such kind in your farming operations.

Ans. I have.

Int. 4. State whether or not when you first hitched the horses to such rake at the commencement of your use thereof you employed cross check-lines, such as are usual in controlling a team hitched side by side in the harness.

Ans. Not exactly that way; not as when I drive a team, but I used a single check-line from one horse to another across the rake from bridle to bridle. I done it for a guide.

Int. 5. Well, did it serve its purpose?

Ans. No, sir.

181 Int. 6. Why not?

Ans. When we drove up the horses against the ricker or lifter-rake then the line would get very often in the hay and it would be a bother all the while.

Int. 7. State whether or not you regarded the cross-line as necessary for the guidance of the team when you first hitched the horses to this pole-rake.

Ans. I thought so.

Int. 8. How long did you continue in the use of this cross-line?

Ans. I don't know exactly; perhaps a day. I found it would not work.

Int. 9. State whether or not during the time you were using this cross-line you had any trouble in getting the load from the rake onto the pitcher-rake.

Ans. Very frequently we had.

Int. 10. When this difficulty occurred what, if anything, did you do for correcting it?

Ans. I had to go on the hay lift over the line again and back them out.

Int. 11. Did this allow you to clear the load from the rake onto the ricker?

Ans. The line would be laying behind the hay and the horses could not back out, so we had to get on the top of the hay and take the line up sometimes.

Int. 12. With the cross-line attached to the horses' bits, state whether or not you succeeded always in drawing the rake onto the pitcher rack so as to leave the load there by simply backing the team.

Ans. Not always; there was a good deal of bother with it.

Int. 13. Explain what the bother was.

182 Ans. Sometimes the line would come behind the hay; at other times—very frequently—the upright fingers of the ricker would slip down a little and the line would get behind them.

Int. 14. Having the hitch cross-line, state whether or not you were able to deliver the full load at once in bulk from the rake to the ricker.

Ans. Not very well. The line would hit the upright fingers of the ricker and prevent the horses from going far enough up to the ricker.

Int. 15. Well, then what did you do?

Ans. Well, we had to back out as best we could and pitch on with a fork afterwards.

Int. 16. You state that in a little while, perhaps about half a day, the cross-line was dispensed with. What, if anything, did you use in its stead?

Ans. In the first place, I can't state how long I used it; only a short time, though; then we used a strap and tied them to the pole—fastened the breast strap to the pole.

Int. 17. How long did that work?

Ans. That worked right.

Int. 18. State whether or not you discovered that the use of cross-

lines or of cross check-lines was unnecessary in the management of the team.

Ans. I thought so. I found that out pretty quick.

Int. 19. What did you find out—that their use was necessary or unnecessary?

Ans. That it was unnecessary.

Int. 20. How many seasons have you used this pole-rake?

Ans. Two seasons.

183 Int. 21. About how much hay each season have you raked with it?

Ans. That is hard for me to explain. I presume about 50 tons is not any too high in a season.

Cross-examination:

X Int. 22. When you were raking out in the field your cross-line did not give you any trouble, did it?

Ans. No, sir; not in the field.

X Int. 23. When you took out the cross-line how did you arrange your lines for driving?

Ans. Just took the outside lines from the teams just as they were hitched upon the wagon.

X Int. 24. Did you have any difficulty in handling or managing your team when the lines were fixed that way?

Ans. No.

X Int. 25. Did you have any instruction or did any one tell you how to fix the lines or to leave out the cross lines or reins?

Ans. I don't know that they did, but there were instructious there for putting up the ricker, and I think the rake, too. I have seen the instructions often. They are there in the house yet. We kept it from year to year.

X Int. 26. Did you follow the instructions when you changed by taking out the cross-lines?

Ans. When I speak about instructions I mean the instructions for putting up the rake and ricker. I do not know whether I ever saw the instructions for putting on the check-lines or not; they may have been there.

X Int. 27. The leaving out of the check-line after the trouble you had with it was your own idea, was it not?

Ans. Yes, sir; so far as I recollect.

184 X Int. 28. If you was using a fork or harpoon stacker the cross-line would not be much in the way, would it?

Ans. I don't know. I never used one.

Redirect:

R. D. Int. 29. State whether or not the cross-line would serve any useful purpose in guiding the team in the field?

Ans. I don't see that it did with me.

BERNARD HESSLING.

WILLIAM FINNELL, a witness called in behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. M. PEIRCE, Esq., counsel for complainant, as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. My name is William Finnell; age, 65; residence is in the city of Peoria; my business is farming.

Int. 2. How long have you been farming?

Ans. Well, the last time I have been farming is about 12 years.

Int. 3. During that time have you ever used a drag or slide rake in your farming operations?

Ans. Yes, sir.

Int. 4. When did you first use such a rake?

Ans. I think it was in 1882, sir, when it was first introduced here in Peoria.

Int. 5. Describe briefly the size of that rake and how the horses were hitched to it.

Ans. Well, to the best of my opinion it was about 12 or 13 feet. I never measured it; 12 or 13 feet wide, I mean. The teeth,
185 I think, were about 8 or 9 feet in length, I think. I did not measure them. There was a beam sticking out at each corner, and a single-tree hitched to it, and the horse hitched to that.

Int. 6. Now were the horses managed or driven?

Ans. Well, I had a boy, who used to ride each horse.

Int. 7. How long did you use such rake?

Ans. Well, I used it one season—in 1882—and put up 100 or 150 tons of hay with it.

Int. 8. How many of those rakes did you have during that season?

Ans. I had two.

Int. 9. Did you use both of them in putting up the hay?

Ans. Yes, sir.

Int. 10. What sort of rakes did you use the next season?

Ans. I used those pole-rakes with little wheels on them and a seat.

Int. 11. What became of the drag-rakes you had used before?

Ans. Mr. Kirk—Mr. Jno. E. Kirk—changed them for me and made them into pole-rakes.

Int. 12. Were the rakes as changed by Mr. Kirk for you the pole-rakes used by you in the season of 1883?

Ans. Yes, sir.

Int. 13. Please examine the drawing of the rake shown in Exhibit "Acme Lithograph No. 2" and state how, if at all, the pole-rakes changed from drag-rakes and used by you in 1883 differed from the rake shown in said drawing.

Ans. I don't think they differed; my eyes are not very good, but I think there is not any difference.

186 Int. 14. State whether or not you have continued to use the pole-rakes each season since the change from the drag-rakes was made.

Ans. Yes, sir.

Int. 15. Have you used the drag-rakes since you began the use of the pole-rakes?

Ans. No, sir.

Int. 16. Why not.

Ans. Because the pole-rakes are the best. I save a boy—one boy drives instead of two; and the next, I dispense with having a man at the stacks to pull back the drag-rakes. The horses could not push them back, and we can do a great deal more work with the pole-rakes in a day.

Int. 17. About how much hay have you raked in the season since you began to use the pole-rakes?

Ans. I think I put up from 150 to 200 tons a year; some years more, some years not so much.

Int. 18. How much do you estimate the money saved to be to you in the use of the pole-rake over the drag-rake per day?

Ans. I think at least $3.00 in the hire of the men and their board; besides, they will do so much more work.

Int. 19. About how much more work will the pole-rake do?

Ans. Well, it depends considerably on the hay; I think about a third more, anyhow.

Int. 20. Have you used the pole-rakes exclusively in raking since you changed over from the drag-rakes?

Ans. Yes, sir; with the exception of in an orchard I have where I could not get around close enough with the pole-rake; I used a sulky-rake; I used the pole-rake at other times.

187 Int. 21. State whether or not when the pole-rakes were first brought to you, in the season of 1883, you regarded cross-hitch or check-lines necessary in order that the team might be controlled by a single driver.

Ans. I thought there would have to be a strap or something to keep them together—between their heads—to keep them from spreading out.

The horses stood about 15 feet apart.

I thought the check-rein had to be used until I saw Mr. Kirk and his man hitching up and splicing the lines.

Cross-examination:

X Int. 22. How did they splice the lines?

Ans. The lines that went inside, across, they made long so that the horses could walk apart.

X Int. 23. Did these inside lines go from one horse to the other?

Ans. Yes, sir; from the back strap of the harness to the bridle of the other horse.

X Int. 24. Could you not rake each day all that you could cut and cure when you had the drag-rakes in 1882?

Ans. Oh, I could, if I only put one mower on; if I put two mowers on I couldn't.

X Int. 25. How many mowers did you use in 1882, and how many this year?

Ans. I used one in 1882, and two this year; I believe three some of the time this year.

X Int. 26. About how many acres of meadow did you have in 1882 and in 1886?

Ans. I most forget. I think I had about 60 or 70 in 1882, and about 130 in 1886.

X Int. 27. Did you use horse-rakes before 1882; and, if so, what kind or kinds?

188 Ans. Well, I used what would be called the sulky-rake with one horse; then I used the tumbling rake, but I used the tumbling rake mostly.

X Int. 28. The first season, in using so different a rake as the drag-rake was from the sulky, it would take the boys awhile to get the hang of it, would it not?

Ans. Yes, sir; it would.

X Int. 29. When you say that you think the boy could do a third more work with the pole-rake than with the drag-rake do you mean he could get in a third more hay or over a third more ground?

Ans. Of course, sir, if he could get in a third more hay he could get over a third more ground; I mean a third more hay and ground, too.

X Int. 30. How could he do that without making the team go faster with the pole-rake?

Ans. When the two boys are driving one boy would not start when the other would, and then when he would start the other would be too far ahead, and when there is one boy driving he holds either horse and lets the rake come round where he wants to without any delay. When he goes in on the ricker he drives the two horses in even together straight on the ricker, and when there are two boys one of them will keep his horse too slow and go in crooked on the ricker and break a tooth in the ricker or in the rake that he is driving. Then when you are getting out from the ricker with the sled-rake a man has to catch it and pull it back, but the tongue-rake you can back out with the horses.

X Int. 31. How much of your hay do you stack?

Ans. I stack all of my hay, pretty much.

189 X Int. 32. About how long does it take to gather and bring into the ricker a rake-load of hay at the average distance of half way from the stack to the outer limit of raking?

Ans. According to the place you make the stack; in the middle of the field, about three minutes. I never timed it. When there are two rakes sometimes one of them has to wait at the ricker; depends also upon the men who are doing the work.

X Int. 33. About what sized fields have you on your farm?

Ans. About 35 or 40 acres. One field has 70 acres in.

Int. 34. Were these fields used for meadows?

Ans. Some of them; sometimes part of them.

Redirect:

R. D. Int. 35. State whether you use cross hitch-lines running from the back strap of the harness of one horse to the bridle of the

other horse in the management of the pole-rakes as you now use them.

Ans. I guess they do. Sometimes the boys used them, I heard them say, without any cross-lines at all.

R. D. Int. 36. Do you know, from your own actual observation of the team, how such lines are now hitched?

Ans. No, sir; I could not see.

R. D. Int. 37. Why could you not see?

Ans. My eyesight for the last three years has been bad.

R. D. Int. 38. How was your eyesight at the time you first saw Mr. Kirk hitching up to the pole-rake, as you have stated?

Ans. They were good at that time.

R. D. Int. 39. State whether or not, from actual close obser-
190 vation and examination of the mode of hitching up the lines as followed by Mr. Kirk, you know that the inside lines on the first pole-rake you saw extended from the back strap of one horse to the bridle of the other.

Ans. I could not positively say, but I think it does. I told my boys to hitch that way.

R. D. Int. 40. Do you swear positively that they ever have hitched them so, to your knowledge?

Ans. I have never driven them only a piece of a day.

R. D. Int. 41. Question 40 repeated.

Ans. Well, no; I could not swear positively. The boys have always hitched the horses since the tongues were put into the rakes; my eyesight has been poor.

Recross-examination:

R. C. Int. 42. Although you are not willing to swear positively, you still think that the way which you described the arrangement of the lines was the way they were fixed, do you not?

Ans. I do; but I would not like to swear to it.

WILLIAM FINNELL.

Adjourned by consent until Friday at 9.30 a. m., Sept. 17, 1886.

FRIDAY, *Sept. 17th., A. D.* 1886.

Met pursuant to adjournment.

Parties present: Counsel as before.

FRANK CORRINGTON, a witness called on behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded to him by J. H. PIERCE, counsel for complainant, as follows:

Int. 1. State your name, age, place of residence, and occupation.

191 Ans. Frank Corrington; age, 37; I live in Richwoods township; I am a farmer.

Int. 2. How long have you been a farmer?

Ans. Ever since I have been big enough to hold a plow or pull a line.

Int. 3. Have you ever used slide or drag rakes in raking hay?

Ans. Yes, sir.

Int. 4. When did you first use such rakes?

Ans. I think in 1882.

Int. 5. Where did you get them?

Ans. I got them in Peoria; manufactured by George Pfeiffer.

Int. 6. From whom were they bought?

Ans. I think I got them from Pfeiffer.

Int. 7. Describe briefly the size of such rake and how the horses were hitched thereto.

Ans. I have never measured it. They are about 12 or 13 feet in length, about 8 feet teeth, with a draft arm at each end and two cast shoes under the rake head; a horse hitched onto each draft arm. Horses were rode by a man on each horse.

Int. 8. Do you remember what name, if any, was marked on those slide-rakes?

Ans. They were marked Champion, and name of J. E. Kirk.

Int 9. How many of such rakes did you then buy?

Ans. Two.

Int. 10. How long did you use them as bought by you?

Ans. One season as a slide-rake.

Int. 11. About how much hay did you rake with them during that season?

192 Ans. About 40 acres.

Int. 12. What became of the rakes after the season in which they were used by you?

Ans. I took off the shoes and put on wheels and poles or tongues and they are still in use by me.

Int. 13. What led you to make these changes in the rake?

Ans. In the fall of 1882, on the Peoria fair ground, I saw the improvement and drove it, and considered it a great advantage over the slide-rake.

Int. 14. What improvement was it which you saw? Please explain.

Ans. The wheels and tongue—giving one man the advantage of driving the two horses better than two men to one rake.

Int. 15. Look at the Exhibit "Acme Lithograph No. 2" and state how, if at all, the rake there shown differs from the improved rake which you saw at the Peoria fair grounds.

Ans. I think that is the same as I saw.

Int. 16. When was it that you made the changes from the old slide-rake to the improved rake, such as shown in said exhibit?

Ans. In 1883.

Int. 17. Since the rakes were changed state whether or not you have continued to use them in their changed condition ever since during each season.

Ans. Yes, sir; excepting this year.

Int. 18. What rake have you used this year?

Ans. The Acme rake, with the attachment for raising the teeth off the ground or pressing them closer to the ground.

193 Int. 19. Look at the Exhibit "Acme Lithograph" and state

how, if at all, the rake there shown differs from the rake with the attachment which you have used this year.

Ans. I think that corresponds with it.

Int. 20. State how, if at all, the hitching of the horses to the projecting poles and draft bars at the sides of the rake differed in the improved rake from the way in which the horses were hitched to the rake with the attachment as used this year by you.

Ans. The horses are hitched the same.

Int. 21. Beginning with the year 1883, when you first used the improved rake with pole attachment, state about how many acres you have raked there with during each season since.

Ans. In 1883, about 100 acres; in 1884, about 135 acres; in 1885, about 100 acres; in 1886, about 70 acres.

Int. 22. What advantage, if any, has the pole-rake as used by you since 1883 over the old slide or drag rake used in 1882?

Ans. It has the advantage of allowing one man to handle it in place of two, as I think he can handle it to a greater advantage.

Int. 23. In your experience will the pole-rake as changed by you do more in a working day than the old slide-rake from which it was changed?

Ans. A man can rake more hay with them.

Int. 23½. About how much more hay to the day do you think can be raked with the pole-rake?

Objected to by L. L. Bond unless the conditions are stated, as the conditions differ every day and in every field.

Ans. I can't tell how much. If the hay is heavy on the
194 ground you might rake a third or a half more. If it is light probably it would not rake more than one-fourth more.

Int. 24. You have stated that the single driver can handle the pole-rake to greater advantage than the old slide or drag rake with its two drivers. State a little more fully where this benefit of the pole-rake comes in in use.

Ans. If the teeth catch in the ground you have the advantage of backing out without turning your horses around. One man can drive straighter and rake the hay cleaner. On leaving the hay on the pitcher head you back out without turning the horses.

Going to the field with empty rake, if a bunch of hay is missed, left in the field, you can gather it up. The old rake had to be drug backwards, so that there was no chance to pick up scattered hay.

Int. 25. What difficulty, if any, was experienced in getting the old drag-rake with its load straight onto or off from the ricker or pitcher head?

Ans. Sometimes one man would let his horse pull a little too fast, throwing the teeth or fingers in an angle that would lock with each other and break them.

Int. 26. State whether or not this difficulty of drawing the rake out of line so as to break the fingers at the ricker exists in the use of the pole-rake.

Ans. It does, but not so much as the other.

Int. 27. What is your idea of the relative advantage of the pole-

rake as compared with the old slide-rake? Which would you have for use?

Ans. I would take the pole-rake.

Int. 28. About how much is the saving to the working day in the use of the pole-rake as compared with the old slide?

195 Ans. There is a difference of from $3 to $4 a day in men's wages, I think, and running expenses.

Int. 29. From whom did you get the poles and wheels in changing your drag-rakes into pole-rakes?

Ans. Mr. John E. Kirk, of Peoria.

Cross-examination by L. L. BOND:

X Int. 30. Did the changes made in 1883 on the 1882 rake include a seat for the driver?

Ans. Yes, sir.

X Int. 31. The taking off of the cast-iron runners and the putting on of wheels and a driver's seat were important improvements, were they not?

Ans. I think the wheels were of some importance. The seat would not be of much importance without the poles.

X Int. 32. The mounting of a man on the rake head back of the axles would cause the front end of the teeth to press on the ground with less weight, would it not?

Ans. Well, I never noticed any material difference.

X Int. 33. The poles without the seat would make the front end of the teeth run heavier on the ground, would they not?

Ans. I think it would be very little, as I seldom ever used the seat, anyway.

X Int. 34. Is the attachment for lifting the front ends of the teeth or front ends of the rake shown in the "Acme lithograph," and used by you during the season of 1886, an improvement of any value?

Ans. They are in a rough meadow.

X Int. 35. Why?

Ans. Where there are little ditches or gullies washed out, with the leverage you can raise the points of the teeth and cross

196 without any trouble. Without the leverage the teeth fingers will catch in the ground and give some trouble.

X Int. 36. So far as catching the teeth in the ground is concerned, were the 1882 rakes any more liable to catch before they were changed than they were afterwards, and was not the principal difference between them before and after the change that after the change you could get off quicker when you was caught?

Ans. The first year I bought the rake I only had 40 acres, and it was smooth meadow; there were no ditches, and I did not experience any trouble of that kind.

X Int. 37. In the average raking, do the teeth catch in the ground very frequently so as to stop the rake?

Ans. No, sir.

X Int. 38. Would not a rake drawn backwards into the field be less liable to catch in the ground than when drawn forwards?

Ans. I think it would.

X Int. 39. You think that with heavy hay you could rake from a third to half and in light hay one-quarter faster with the same rakes after the poles were applied than before? Please explain more fully how such a great difference in time can be made.

Ans. By one man driving his horses.

X Int. 40. Your experience with rakes of this kind, without poles, was confined to the season of 1882, was it not?

Ans. Yes, sir.

X Int. 41. Does it not take a little time for both men and horses to get the hang of a new rake, and would it not be particularly so with a rake where the horses were separated so much farther apart than they had been used to working?

197 Ans. My experience has been that the horses learn their place in less than a half a day, and I think a man ought to.

X Int. 42. In 1882 you could rake all the hay you could cut and cure, could you not?

Ans. With our mower I could.

X Int. 43. One mower was all you wanted for 40 acres, wasn't it?

Ans. Yes, sir.

X Int. 44. If you increased the number of mowers you would have to increase the number of rakes, whether they had poles or not, would you not?

Ans. That is owing to how heavy the hay is.

X Int. 45. How frequently did the breaking of teeth in the rake or in the pitcher head occur in 1882, from bad management of the team?

Ans. I don't remember just how often.

X Int. 46. Was such breakage of frequent occurrence in 1882, or has it been since?

Ans. I don't remember how often it was in 1882. There has been some little since, but none this year.

X Int. 47. How was the hay crop this year, heavy or light?

Ans. About medium, I think.

Redirect examination:

R. D. Int. 48. Look at the rake shown in Exhibit "Acme Lithograph No. 2," and state whether or not, if the poles were omitted, but the wheels and seat retained, the horses could be managed and guided by the single driver.

Ans. I don't know; I never tried that experiment.

R. D. Int. 49. Such a rake would be the old drag-rake ex-

198 cept in the use of the wheels for the runners and the addition of a seat. From your knowledge of the way in which the drag-rake horses were managed by a driver on each of them, state whether or not, in your judgment, the rake without the poles could be managed by the single driver on the seat.

Ans. Omitting the poles, I think the rake would be virtually the old drag-rake. If a team could be driven with a cross-check by one man, omitting the poles, I think that they would lose more than it would take to hire the extra man.

R. D. Int. 50. What rake did you have in mind in stating that the horses could learn their places in less than half a day, and "I think a man ought to"?

Ans. A rake with poles, such as I used in 1883, '4, '5, and '6.

R. D. Int. 51. Would you think it possible to control and manage a drag-rake team, the rake having no guide poles, in raking hay and delivering to the ricker by a single driver?

Ans. I would not undertake it.

FRANK CORRINGTON.

RICHARD NOTT, a witness called on behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. H. PEIRCE, counsel for complainant, as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. Richard Nott; age, 56; Richwoods township, Peoria county, Illinois. I am a farmer.

Int. 2. How long have you been a farmer, sir?

Ans. All my lifetime, sir.

Int. 3. Look at the rake shown in the Exhibit "Acme
199 Lithograph No. 2" and state whether or not you have ever used a rake such as that in raking hay.

Ans. Yes, sir.

Int. 4. How long ago has it been that you first used it?

Ans. It is 3 or 4 years ago, anyhow.

Int. 5. How many seasons have you used such rake?

Ans. That is three or four years. We used it every year.

Int. 6. Before you got that rake what kind of rake had you used?

Ans. We used the other kind of rake that the boys rode on the horse's back, with no tongues to it.

Int. 7. From whom did you buy the tongue-rakes like that shown in said lithograph No. 2?

Ans. From Mr. Rouse, in Peoria.

Int. 8. Whose manufacture was that pole-rake?

Ans. Mr. John E. Kirk.

Int. 9. About how far across did the rake measure between the horses?

Ans. Well, I could not say exactly. It was a long way across, anyhow.

Int. 10. State what, if any, difficulty occurred to you as to the possibility of hitching the horses so far apart to the poles of that pole-rake you first bought and yet being able to manage the team with a single (driver).

Ans. Well, we thought no one man ever could drive them.

Int. 11. Why did you think so?

Ans. Well, we thought the horses were so far apart that no one man could guide them. They would run away or something or other.

Cross-examination waived.

RICHARD NOTT.

200 GEORGE PFEIFFER, Jr., a witness called on behalf of the complainant, being first duly sworn, deposes, in answer to interrogatories propounded by J. H. PEIRCE, counsel for complainant, as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. George Pfeiffer, Jr.; I will be 42 Sept. 7th, 1886; Peoria, Ill.; occupation, carriage and wagon builder.

Int. 2. How long have you been engaged in such business?

Ans. I have been in business for myself since 1868; have been in shops 22 years.

Int. 3. State whether or not you are familiar with the ordinary modes of hitching and driving horses in various vehicles in common use.

Ans. I am considered one of the best horsemen in Peoria to-day. I am familiar with the various ways of handling and hitching horses.

Int. 4. State what your experience has been enabling you to become thus familiar, as mentioned.

Ans. I have driven horses in the town and about the town ever since I was nine years old. I was on a farm six years and I run a livery stable two years.

Int. 5. Were you engaged in building wagons and carriages in the year 1882?

Ans. Yes, sir; I was

Int. 6. Where and with whom?

Ans. At 532, 534, 536, and 538 South Adams St., Peoria, Ill.; with E. C. Pfeiffer—the firm was known as Geo. Pfeiffer & Co.

Int. 7. Do you know John E. Kirk, president of the Acme Hay Harvester Co., the complainant in this cause?

Ans. Yes, sir.

201 Int. 8. State when and under what circumstances you first knew him.

Ans. It was in the winter of 1882 or towards spring he came to our shops and wanted us to build 150 rickers and 300 rakes, to the best of my recollection.

Int. 9. Did you build those rakes for him?

Ans. Yes, sir.

Int. 10. During what year were they built?

Ans. In 1882.

Int. 11. Describe briefly the construction of such rake, giving some idea of dimensions and the manner of hitching the horses thereto.

Ans. The rake was about 13 feet wide, teeth were 8 feet long, and they were hitched to a lever or beam at each end (the horses I mean were so hitched). The beams stuck out about three feet from the end of the rake on both ends and they were made with a slide or kind of cast-iron sleigh-runner instead of this wheel (pointing to the picture on "Acme lithograph No. 2").

Int. 12. State whether or not this lot of 300 rakes had hitching

poles thereon at each side for the horses, as shown in the rake in "Acme lithograph No. 2."

Ans. No; they didn't have any on.

Int. 13. State about when and from whom you first learned of a hay-rake having hitching poles at its ends, as shown in said exhibit.

Ans. I first learned it from John E. Kirk about June or July, 1882.

Int. 14. Did Mr. Kirk at that time fully explain to you how such poles were to be applied and used in a hay-rake?

Ans. Yes, sir.

Int. 15. What, if any, opinions did you thereupon have
202 as to the practicability of using such poles and managing the hay-rake team thereby?

Ans. I told him that I did not think he could make it work, because his horses would be so far apart; I did not see how one man could handle them.

Int. 16. State where, if ever, you made a pole-rake for Mr. Kirk like that shown in the Exhibit "Acme Lithograph No. 2."

Ans. In the fall of 1882 I made one.

Int. 17. After that rake had been made with the poles thereon and set up in condition for use, state what, if any, opinion you then had or expressed as to the feasibility of using such poles and yet managing the team by a single driver.

Ans. I told him I did not think it would work; did not think a man could handle them. It does not look reasonable, even now, that a man can handle them.

Int. 18. Prior to seeing this finished pole-rake had you seen drag-rakes without the poles, such as made by you for Mr. Kirk early in 1882, in operation in the field?

Ans. I helped to set one up and started it in the field before there were any poles put on it; before I ever saw one with a pole.

Int. 19. State what, if any, difficulties were observed by you in managing the drag-rake having no poles.

Ans. The difficulty is this: You put horses onto a thing like this rake with a boy on each one; first one horse will go ahead and then the other, and then the horse not having anything to guide him is liable to get around to these rake teeth. Then if you run into anything with the rake teeth and get stuck in any way the horses have
203 to be turned clear around and pull the rake out backwards before you can get out. I have seen all this myself and know how it works.

In pulling the hay onto the ricker teeth, with nothing to guide the horses excepting with a boy on them or a man, they are liable to pull crossways and break the teeth of both the rake and the ricker, and then after the hay is pulled onto the ricker teeth there is no way of backing out without turning the horses around and pulling back the rake. Then when you start out for a new load you have got to turn clear around to pick up any loose hay that has been dropped or missed.

Int. 20. Since you first expressed your opinion as to the imprac-

ticability of the poles for managing and guiding the rake team hitched thereto by a single driver have you changed your opinion in such respect?

Ans. I saw one working this year, 1886, with the tongue attachment. It worked all right, just as any team hitched to a wagon or other vehicle would.

Cross-examination by L. L. BOND:

X Int. 21. You thought that the 300 rakes which you made for Kirk were good ones, did you not; good, practical rakes, I mean?

Ans. My honest opinion was they were going to be a failure.

X Int. 22. Did you ever see any of these 300 rakes in actual field use?

Ans. Yes, sir; I saw two of them that I can remember of positively in 1882.

X Int. 23. Did you change your mind with respect to their practicability?

Ans. Yes, sir; after seeing them work.

204 X Int. 24. They did good work, did they not?

Ans. Not very good; no.

X Int. 25. Did you see the horses get onto the teeth?

Ans. I saw them get around into them pretty close, closer than I would want a horse of mine to get and risk breaking his legs.

X Int. 26. When you saw the rakes in use was it just starting up or had the team got acquainted with the rake?

Ans. I don't think they had ever been hitched onto a rake before, from the way they acted.

Redirect:

R. D. Int. 27. Was the team a gentle one?

Ans. Yes, sir.

R. D. Int. 28. Who managed it?

Ans. There was a couple of half-grown men, one on each horse.

GEORGE PFEIFFER, JR.

Counsel for complainant offers in evidence a full-sized working rake manufactured by the complainant company, like that shown in "Acme lithograph, No. 2," such rake by consent to be produced at the hearing.

Counsel for complainant offers in evidence the instruction referred to by the witness Patton, also the cut referred to therein. The same are marked "Complainant's Exhibit Champion Circular and Posters, 1883."

Stipulated between counsel that the testimony for complainant in rebuttal, taken before George Page, at Peoria, Illinois, be de-

205 livered by him to counsel for complainant, and be filed by said counsel with the clerk of the court in time for the hearing.

PEIRCE & FISHER,
Solicitors for Complainant.
WEST & BOND,
Solicitors for Defendants.

STATE OF ILLINOIS, } ss:
County of Peoria, }

I, George T. Page, a notary public in and for the county of Peoria, in the State aforesaid, do hereby certify that the foregoing depositions of Charles H. Crone, Oscar A. Hale, Nelson S. Johnson, Nathaniel T. Patton, Bernard Hessling, William Finnell, Frank Corrington, Richard Nott, and George Pfeiffer, Jr., were taken by and before me at the times and place therein specified, pursuant to agreement between counsel for the complainant and defendants respectively; that the parties to the said cause were present at the taking of the same—complainant by its counsel, J. H. Peirce, Esq., and defendants by their counsel, L. L. Bond, Esq.—as therein appears; that before deposing the said Charles H. Crone, Oscar A. Hale, Nelson S. Johnson, Nathaniel T. Patton, Bernard Hessling, William Finnell, Frank Corrington, Richard Nott, and George Pfeiffer, Jr., were each by me first duly sworn to tell the truth, the whole truth, and nothing but the truth in the cause now pending in the United States circuit court for the northern district of Illinois, wherein The Acme Hay Harvester Company is complainant and Stephen Martin *et al.* are defendants; that their depositions were reduced to writing from their statements by me and the same duly subscribed to by them, as therein appears.

206 And I do further certify that I am neither attorney nor of counsel for any of the parties in said depositions or caption named, and am in nowise interested in the result of said cause.

In testimony whereof I have hereunto set my hand and affixed my notarial seal this 17th day of September, 1886.

GEORGE T. PAGE,
[SEAL.] *Notary Public.*

By consent of counsel the further taking of testimony is adjourned until Tuesday, September 28th, 1886, at 10.30 o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

TUESDAY, *September 28th*, 1886—10.30 o'clock in the forenoon.

Met pursuant to adjournment.
Present as before.

MELVILLE E. DAYTON, a witness produced on the part of the complainant, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by J. H. PEIRCE, Esq., as follows:

Int. 1. Are you the same Melville E. Dayton who has heretofore testified in this cause on behalf of the complainant?

Ans. I am.

Int. 2. Have you examined the specifications and drawings of the letters patent granted severally to Pennock, Lyman and Baldwin, Roney, Currier, Mason, King, Wicks, Middlecoff, Hudson,

207 Whitney, Carrothers, Bean, Rumrill, Swinnerton, Fowler, Nicholls and Patton, heretofore introduced as exhibits in

behalf of the defendants in this cause; and, if so, do you understand the inventions set forth in the same, respectively?

Ans. I have examined and believe I understand the inventions set forth in said patents.

Int. 3. Examine each of the defendants' exhibit patents named, and state whether you find in either of them the invention described and claimed in Complainant's Exhibit Kenaga Patent, and give your reasons for the conclusions you may reach.

Ans. Referring to the Kenaga patent, to obtain, in the first place, a clear idea of his invention, before making the comparison called for, I find said Kenaga patent to state that the invention relates to a well-defined class of hay-rakes, being those employed in connection with stackers, and more "particularly to those rakes of this class which are drawn by horses hitched one at each end." The patent goes on to say that prior to the Kenaga invention rakes of this class, which are defined to be about twelve feet long, had been drawn out from beneath the load when delivered to the stacker by wheeling the horses about and drawing the rake backward. To enable the horses to be thus wheeled about each horse was separately hitched to the rake and was separately managed by an independent rider—that is to say (quoting from the patent), "each horse requires a separate rider, who must be a boy not so large as to overburden the animal, and yet old enough to manage the horse intelligently." The hitching devices in this case were exclusively adapted for draft purposes, and were common, I believe, ordinary traces and single-trees,
208 which were connected by a chain or other flexible attachment with arms laterally projecting from the ends of the rake head.

In the operation of the old rake, not only was the rake backed out from under its load by each rider wheeling his horse around the other way and then drawing the rake backward, but the rake was further drawn backward across the field to the point where it was desired to commence taking up another load, and here the horses were again turned or wheeled about into position to draw the rake forward. In both these backward and forward movements of the rake the horses were guided by two separate intelligences with obvious disadvantages that need not be enumerated.

The Kenaga patent states the object of the invention therein set forth as follows: "By my invention I seek to do away with riders, and to enable a single man or boy to manage both horses so attached" (that is, at the extreme ends of the rake and alongside of it), "such person being mounted on the rake or walking behind it." In the broad statement of invention given by the patent it is said that "to this end my invention consists in providing means at each end of the rake, whereby the horses there attached may back the rake out from under its load instead of turning around and drawing it out." I understand this statement of invention to mean, of course, such means substantially as thereafter described by which the horses may be made to back the rake from under its load under the exclusive management of a single man or boy standing or riding behind the middle of the rake.

The means defined in the patent by which the two horses hitched thus remotely from each other to the ends of the rake may be managed and backed from under the load by a single driver at
209 the rear centrally of the rake are, first, two stiff poles projecting forwardly, upwardly, and outwardly from the rake head, the front end of said poles being located in position and provided with means by which they may be hitched to the breast straps of the horses; and, second, thills attached to the draft bars and accompanied by the same poles before mentioned, except that said poles in this case may be less stiff or lighter, because they are not to be used to receive the backing strain of the horses, but only as guides to the horses or aids in guiding them by furnishing points of attachment to which the horses' heads or bits may be hitched.

The statement of the patent with respect to thills and poles in place of poles alone is as follows:

"If preferred, a pair of thills may be connected with each of the arms B B, in which the horse is hitched in the usual way, which construction would be the equivalent of that shown in the drawing. When thills are used, however, it will be advisable to employ the poles 'B C,' by which to hitch the horses' heads as an aid in guiding them, in which case said poles may be relatively light."

By the words "a pair of thills may be connected with each of the arms B B" I understand is meant that such thills will be flexibly attached by substantially the same means employed in the patent for attaching the single-trees or by a staple and clevis, or such modifications of these as are commonly employed in attaching such thills, as, for example, in the familiar use of them in connection with horse cars. Thills so attached and having the horses hitched in them "in the usual way" will, of course, take the backing strain, precisely the same as the stiff poles C C previously mentioned in the patent; but obviously they will not operate to guide the horses as the
210 poles will do, and the conjunctive use of said poles is therefore, as the patent states, "advisable" or necessary to ensure the proper guiding of the horses in the backing and turning movements of the team and rake, contemplated as a new mode of operating this class of machines.

What is said in the above-quoted passage as to the retention of the poles B as guiding devices when the thills are used to take the backing strain clearly shows that the poles, when used alone, are relied on as guides or aids in guiding the team, as well as a medium of the backing strain. Independently of this statement of the patent, however, it is manifest that the stiff poles C C, hitched to the horses as described, do and must aid in guiding the horses in their backing and wheeling movements. The value of this guiding function of the poles C C becomes apparent on reflecting that the horses are, say, sixteen feet apart and that the driver is so near them that when looking at one he cannot see the other. It would be impossible, therefore, for the driver to properly guide both horses in their backing and wheeling movements from his position without the aid of the poles C. Said poles C, therefore, have not only the function of affording a medium for backing the rake, but also and inevitably

the function of aiding in guiding the independently hitched horses. While, therefore, the thills are in themselves the equivalent of the poles as a medium for the backing strain alone of the team, the thills and poles together are required to constitute the full equivalent of the stiff poles alone in their character of backing and guiding devices.

The language of the specification found at lines 56 to 61 may be further cited as indicating that the horses are to be hitched both fore and aft in order to enable the driver, sitting or standing back
211 and centrally of the rake, to back or direct them with ease.

The next following words of the specification, to wit, "By having the reins split back to a point in convenient reach (of the driver) he will be able to back one horse or otherwise manage him independently of the other," I think clearly indicates a reliance upon both forward and aft hitching of the horses to ensure their proper working and guidance when we take into account that the driver sits or stands where he can see only the one horse at a time, which he may be thus engaged in directing or backing.

The words of the patent last quoted still further indicate the completeness and comprehensiveness of this invention, inasmuch as it is impracticable to employ the usual construction of cross check-reins, both because the horses are so far apart and because the cross-reins, if present, would be in the way of accumulating the proper load—of delivering the load upon at least some forms of hay-stackers.

What was old in the rake described in the Kenaga patent was the rake proper and the projecting draft bars to which the horses were hitched. What is new in the Kenaga patent is the added elements of stiff poles having their front ends arranged in position to be hitched by breast straps to the horses so as to enable the rake to be backed from under its load, and also serving to aid in guiding the horses when driven by a single man or boy located centrally behind the rake or the equivalents of these guiding and backing poles. Other new features not specified in the Kenaga claim or forming an essential part of the patent, but which grow out of the invention as specified in the claim, are a driver's seat located behind the middle of the rake and the independent reins by which each of the
212 horses may be separately backed or managed by the driver in this position. While drivers' seats have been located on machines of various kinds, behind and between horses hitched somewhat more widely apart than when driven to a common wagon, I know of no instance, prior to the date of Kenaga's patent, where horses have been hitched at a distance of twelve, fourteen, or sixteen feet apart, and have been managed by a single driver located midway behind them or by means of reins allowing the several horses to be separately backed or directed by a single driver so placed.

The Kenaga invention is therefore distinctive, not only with respect to the guiding and backing devices specified in the patent as new, but it is distinctive also as to the entire mode of operation of the machine with respect to its guidance and handling, and, in view of the distance from each other at which the horses are placed, with

respect further to their capacity of being guided and separately managed by a single driver riding between and behind.

I find in none of the defendants' exhibit patents named in the question the invention described and claimed in Complainant's Exhibit Kenaga Patent.

The Pennock horse-rake does not belong to the class of rakes which the Kenaga patent specifies as the basis of the invention there described. On the other hand, the Pennock rake is one in which the horses are hitched in front of the rake teeth and not at the ends or one at each end, as stated and shown in the Kenaga patent. The Pennock rake is evidently intended for making windrows in the field, and is not adapted in any way to the accumulation of a body of hay upon it for delivery upon the platform or forks of a stacker, as
213 contemplated in the system of hay harvesting referred to in the Kenaga patent, and to which the Kenaga invention belongs. The devices in the Pennock patent to which the horses are hitched are even different from the devices of the old rake on which Kenaga improved, and not only does the Pennock patent want or lack the laterally projecting draft bars B of the Kenaga patent, but it is also wholly destitute of anything answering in any degree to the purposes, functions, or construction of the poles C or their equivalents specified in the Kenaga patent. The Pennock rake, moreover, is discharged in a wholly different way from that of the stacker-rake improved by Kenaga; or, in other words, the Pennock rake is not discharged by drawing it out from under the load, but by means especially provided for drawing the load forward off the rake teeth when the latter are brought to rest.

The Pennock rake is even farther removed from the Kenaga invention than that specified in the Kenaga patent as the basis of the invention there described.

The Lyman & Baldwin patent describes a hay-loader, or, in other words, a wagon for receiving the load of hay, and provided with elevating rakes which first gather the hay as the vehicle is moved across the field, and then lift and dump it into the wagon behind it. The horses are not hitched to the rake at all in this device, but are hitched to the wagon in the usual manner—that is, on opposite sides of a central pole projecting from the front axle and close to each other, as when hitched double to an ordinary farm wagon or road vehicle. The rake, instead of being placed between the horses, is wholly in front of them, and is pushed forward in this position by means of poles or beams reaching back in connection with the front end of the vehicle. The rake is never intended to be backed
214 from under a load, but is to be discharged in a wholly different way, to wit, by lifting the rake upon the rearwardly extended beams which carry it over the horses' heads and dumping the load into the wagon behind. There is not in this Lyman and Baldwin patent or device the slightest suggestion of that mode of operation characteristic of stacker-rakes, and much less of the particular improvement in such rakes which is described and claimed in the Kenaga patent. There are no projecting bars answering to the arms or draft bars B B of the Kenaga patent, by

which the horses may be hitched alongside and at the ends of the rake; there are no backing poles or their equivalents in combination with such draft bars or in the position shown in the Kenaga patent, and the device, in my judgment, is not adapted to be backed out from under a load and be practically operated in connection with a stacker in the manner described in the Kenaga patent, either of the old form of stacker-rake or of the new form containing the Kenaga improvement.

The Roney patent shows and describes a mowing machine, and not a horse-rake at all. The cutter bar in the Roney machine is mounted upon the front end of a wheeled vehicle, and the horses are mounted behind the cutter bar, one at each side of the vehicle. The drawing shows laterally projecting arms J at the rear end of the vehicle and single-trees pivoted to these arms, to which the horses are evidently to be hitched by traces. Indeed, the projecting arms J J are really the ends of a long centrally pivoted evener having whiffletrees K K[1] pivoted thereto "for receiving the traces of the horses." The horses are hitched in front by breast straps to the end of the cross-bar E, which projects laterally from the body of the vehicle, and the machine is turned in its course or
215 guided wholly by the operator mounted on a rear seat, not by directing the horses, but by manipulation of levers which swing the front and swivelled axle of the machine body.

The substitution of rake teeth in place of the cutter-bar fingers would not give to this device any resemblance to the class of rakes to which the Kenaga invention belongs, but would make it merely a mounted rake with the horses behind it instead of at its ends, and without further change it would then, as now, be guided by machinery connected to the front axle and not by a driver aided by backing poles or their equivalents. In short, to my mind, there is nothing in the Roney patent or machine in common with the class of rakes to which Kenaga's invention belongs or which suggests such a rake or Kenaga's improvement thereof.

The Currier patent shows a corn-harvester intended to be drawn through the field by two horses hitched in front of it and traveling on opposite sides of the row of corn to be cut, but not on opposite sides of any part of the machine. Like numerous other corn-harvesting machines in which the horses straddle the row, duplex poles are used instead of one, said poles projecting forward from the machine and being far enough apart to allow the tops of the corn to pass backward between them and to bring the horses into position between said row to be cut and the two adjacent rows, say three and a half to four feet apart, or about at the same distance apart at which horses are frequently driven in our streets with but a single pole between them. In this Currier machine the horses are doubtless separately hitched forward to the said poles G G, and at the rear to the separate points of connection a^1 a^1, but they are as strictly hitched at the front of the machine, and not at its sides,
216 as any of the double teams I now see from the window are hitched in front of the wagons they are drawing. The substitution of a hay-rake in place of the cutting mechanism of this

Currier machine, and particularly of the long rake to which the Kenaga invention relates, would bring the rake wholly behind the horses and not between them, and the structure thus altered would bear no resemblance in construction, mode of operation, or adaptation to the class of rakes upon which Kenaga's is an improvement. I see nothing in the Currier corn-harvester to suggest the invention and new mode of operation which Kenaga applied to the old form of stacker-rakes.

The Mason patent merely shows double thills to be used in place of a single neap or tongue for wagons with the addition of mud guards standing in front of the wheels of the vehicle to which the double thills are to be attached. The invention does not contemplate any new location of the horses with respect to the vehicle to which the double thills may be applied, but locates them in front of the vehicle as though a single tongue were used. The patent, to my mind, does not afford the remotest suggestion of the Kenaga invention or of the new mode of operation which he introduced by said invention into the management of horse hay-rakes of the class used in connection with stackers.

The King horse-rake is a double-ender machine essentially of the class which the Kenaga patent recognizes as old and upon which the Kenaga invention is an improvement, except that in this King rake, instead of employing laterally projecting arms or draft bars to bring the horses off well at the sides of the rake and laterally clear of the rake teeth, it contemplates driving the horses in front of the ends of the rake and hitching the horses so far forward of the rake head that they will clear the teeth behind them.

217 For this purpose swinging frames K are provided, which are pivoted on vertical axes over the ends of the rake head and to the forward and free ends of which the horses are severally hitched. Aside from this difference in construction and position of the horses the King rake differs from the old rakes acknowledged in the Kenaga patent in having rake teeth projecting on both sides of the rake head, so that the rake will operate when drawn in either direction—that is, after delivering a load of hay the horses may be swung around and made to draw the rake from under the load, and the previously disused teeth will operate to gather the next load without again reversing the horses, such reversal being only necessary in discharging the load by dragging the rake back from beneath it.

The King rake does not have so many elements of the Kenaga improved rake as the Kenaga rake admits to be old, but has the same characteristic mode of operation in unloading the rake that belongs to the old rake acknowledged by Kenaga, together with an improvement in a wholly different direction from Kenaga's in the second series of rake teeth, which makes the machine a double-ender. It furnishes no suggestion of the Kenaga improvement.

The Wicks revolving rake is a machine of a wholly different class, being one which is discharged by lifting the rear end of the rake and the load thereon so as to throw the teeth into the ground and to insure the turning over of the rake in the further forward movement of the team. The horses are hitched in front of the rake

on opposite sides of a single central pole, and not at the ends or sides of the rake, as in that class of machines upon which
218 Kenaga's is an improvement. In fact, the Wicks rake is not a stacker-rake, but a windrowing rake, intended to accumulate only light loads, such as may be lifted by the operator sufficiently to throw the points of the rake teeth into the ground that it may be discharged by the tipping-over movement described.

In the Wicks rake there are not only no laterally projecting draft bars answering to the arms or bars B B of the Kenaga patent and attached to the rake head, but such draft bars could not be used in connection with the rocking frame shown in said Wicks patent. The draft must, in the Wicks rake, be upon or from the front end of the rocking frame there shown, for otherwise the draft of the horses would tip the rake over forwardly and so prevent it from working practically. The Wicks rake therefore not only does not suggest the Kenaga improvement, but such improvement could not be applied thereto without total reorganization and abandonment of the distinctive purposes of the Wicks invention.

The Middlecoff patent shows a horse-rake essentially of the class acknowledged as old in the Kenaga patent, except that it is more primitive in not having draft bars projecting laterally from the rake head so as to bring the horses laterally clear of the rake teeth, but in having the horses hitched further forward and in front of the extreme end teeth of the rake. In this respect the Middlecoff corresponds with the King rake already referred to. The Middlecoff rake is, however, a single-ender; is pulled out from under the load by reversing the horses, and the horses are again reversed to gather another load. There is in the Middlecoff patent and rake neither the element of draft bars nor that of backing devices which distinguish Kenaga's invention, and there is no suggestion of his improvement.

219 The Hudson patent shows a horse-rake, illustrating which a full-sized machine (except that it is shortened between the wheels) is present as an exhibit in this case. This rake consists essentially of a rake head mounted on wheels and having draft bars projecting at the ends of the rake identical with the journals on which the wheels are mounted. Rings are fastened to the projecting ends of the wheel journals or axle, to which the horses are severally hitched behind to draw the machine. The horses are not hitched forward to anything, but they are ridden by separate riders and wheeled around to back the rake from beneath its load. The machine corresponds, therefore, in these particulars with those acknowledged in Kenaga's patent as the basis of his improvement; but there are in the Hudson patent and machine certain forwardly projecting poles extending over and in the same vertical planes with the outermost teeth of the rake. These poles stand at their front ends in convenient reach of the riders and are intended to enable the riders to lift the rake teeth and the load thereon when approaching an obstruction so that the teeth may clear it. These poles will therefore be nearly on a level, though somewhat below, the horses' backs, since that will be a convenient position to enable them to be

reached by the rider. Probably to enable the rider to lift to advantage they should be somewhat below the level of his hand when hanging at his side and he is sitting erect. They could not, however, be far below, for otherwise he could not lift upon them to advantage.

The patent does not specify their exact height, but provides means for their adjustment to various heights with reference to different sizes of horses. The patent also does not specify how far forward these poles project; but the drawing shows clearly in figure 2 that they are about three-fourths of the length of the rake teeth in front of the axle, which teeth or prongs are said in the patent to be about eight feet long. Figure 1 of the printed patent does not show these poles C as shorter than the rake teeth beneath them; but in the certified copy of the Patent Office drawings marked "Complainant's Exhibit Hudson Original Drawing" cross-lines showing the ends of said arms C indicate that they are shorter than the subjacent rake-teeth. From the statements of the patent as to these poles or arms C C, as well as from the drawing, it is evident to me that they are intended to be no longer than is necessary to enable the riders to lift them by their ends, which would bring their extremities, say, a foot or more in rear of the horses' shoulders. In my judgment these poles C C of the Hudson patent and machine are wholly unsuited to the forward attachment of the horses to them for backing purposes for several reasons. First, they are too short; second, they are too high, and, third, they are too far inward over the rake. Being too high, if the horses were hitched forward to them, the tendency in backing would be to tip the rake upward or lift the rake and load off the ground. Being too short, the horses in backing would strike against the wheels or over the whiffletrees before coming to a strain on the ends of the poles. The backward movement of the horses before coming to a strain on the poles would of course be twice the length of the straps leading forward from the ends of the poles to the horses' breasts when the latter are in a drawing position, and this would take the horses' heels back of the wheel axles and out of the traces. The ends of the poles being too far inward over the end of the rake, a backing movement of the horses would draw them in against the poles and into a position where the rake teeth would interfere with and endanger their feet. Moreover, a backing movement of the horses would crowd the riders' legs against the poles, and, for this reason alone, would render their use for backing purposes wholly impractical if the riders were retained. Not only, therefore, does the patent itself state a use for these poles C C for a wholly different purpose than backing, but it shows a construction and declares a purpose with which the use of the poles for backing is entirely inconsistent and which renders the use of the poles for backing purposes wholly impracticable.

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By consent of counsel the further taking of testimony is adjourned until Wednesday, September 29th, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

WEDNESDAY, *September 29th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

(Answer resumed:)

I should add that the extreme elevation of the front ends of the pole C in the Hudson device, taken in connection with the shortness of said poles, will also contribute to the tendency of the rake to tip up under a backing strain of the horses if attached to the ends of the poles; or, in other words, the tendency to tip the rake is greater, by reason of the shortness of the poles as well as by reason of their elevation. This becomes evident by supposing the backing strain to be applied to the slotted standards which rise from the
222 Hudson rake head, for in this case the rearward strain would exclusively operate to tip the rake and would not operate at all to back it. The longer the backing poles the less will be this tipping tendency and the greater the part of the rearwardly applied force that becomes operative to back the rake. The Hudson poles C C being two or three feet, or perhaps more than that, shorter than they should be if designed to afford a forward hitch for the horses for backing purposes, they are, by reason of their shortness as well as by reason of their too great elevation, particularly unsuited for such attachment of the horses to back the rake.

I therefore find no part of Kenaga's improvement in the forwardly extended arms or poles C C of the Hudson patent and rake, and no suggestion of such improvement or adaptation to the purposes and functions of Kenaga's backing poles. These poles of the Kenaga patent are therein particularly described as being inclined outwardly, so as to bring their front ends well outside the rake teeth, and the drawing distinctly shows the front ends of said poles so far outside of the rake teeth that they serve inevitably as guards or guides in position to keep the horses' feet clear from the adjacent rake teeth in the various movements of the rake. This appears to me to be a vital matter in the practical operation of the rake when the horses are managed by a single driver, who is in such a position that he cannot have his eye upon both horses at once, and could not by means of reins alone keep the horses off the rake teeth in the various movements contemplated and required in the use of this kind of rake. The lack of this feature alone in the Hudson patent, taken in connection with the wholly different purposes of said poles set forth in the patent, in my judgment, marks a clear dis-
223 tinction between the Hudson and the Kenaga devices, but finding the Hudson poles C C not only in the necessary position of the Kenaga backing poles, but also too short and too high for backing purposes, it seems to me the Hudson rake is wholly destitute of the Kenaga improvements.

The Whitney patent shows a corn-harvester of essentially the same class and kind shown in the Currier patent. The horses are hitched wholly in front of the machine and are separated by duplex poles having only space enough between them to allow the plants to pass back to the cutting mechanism and to bring the horses be-

tween the row of plants being cut and those adjacent to it, say four feet apart. The substitution of raking mechanism in place of the corn-cutting mechanism of the Whitney patent would bring the rake behind the horses and not between them, and such a rake would not be of the class specified in the Kenaga patent as the basis of the improvement there claimed. The Kenaga invention not being broadly for the use of two poles on the same machine, but for particular arrangement and location of two poles on a particular machine and definitely defined parts of such machine and in combination with other elements specified, there is nothing in this Whitney patent which corresponds with or suggests said Kenaga invention.

The Carrothers patent also shows a corn-harvester intended to be drawn by two horses and in its other general features corresponding essentially with the Currier and Whitney corn-harvesters. The cutting devices in this Carrothers patent consists essentially of forwardly projecting vibrating knives located at the middle and front of the machine. The vehicle to which these cutters are attached and which is to receive the load of severed corn ears is a
224 four-wheeled one, and the horses which draw it are hitched in separate thills wholly in front of the vehicle. The cutting knives are shown as projecting forward between the rear parts of the thills and possibly between the rear parts of the horses, though this is by no means certain. The drawing is wholly out of proportion, and as made would indicate that the horses are hitched very widely apart. This, however, cannot in fact be the case, since the machine, being a corn-harvester, will be of such width that its wheels will straddle only the one row of corn to be cut and the horses will travel in front of the wheels. If the machine straddled more than a single row of corn to be cut it would break down the other rows over which it would pass and make it impossible to subsequently cut the corn therefrom by the machine. It is fair to assume, therefore, that the machine is in width and in respect to the space between the horses essentially the same as shown in the Whitney and Currier patents, wherein the drawings in better proportion show the horses as hitched to travel in tracks about four feet apart or with only sufficient space between them to allow the standing corn that is to be cut to pass back to the machine. The Carrothers patent has therefore no more bearing upon the Kenaga hay-raking device than either of said Whitney and Currier patents, except that in the disproportionate drawing of the Carrothers device the vibrating cutters P P appear to project at their forward ends, possibly between the hind legs of the team. I do not regard this incidental fact as in any way suggesting the Kenaga improvement, any more than I would the location of the foot-board of a driver's seat between the haunches of the horses on any other form of wagon. There was in these corn-
225 harvesters no such mode of operation as characterized the old hay-rake, and the application thereto of double poles or two pairs of thills for the horses did not change the mode of operation of such machines with respect to the management of the horses or with respect to the discharge of the load. I therefore find in the

Carrothers patent, as in the Whitney and Currier patents, no suggestion of the Kenaga improvement in horse hay-rakes.

The Bean patent shows a horse hay-rake for gathering a load in the field and delivering it to a point of discharge, which apparently might be the platform of a hay-stacker. The horses are hitched by traces, whiffletrees, and ropes or chains to the ends of the prolonged wheel journals, and, as shown in the drawing, is drawn upon an elevated dump over inclined ways, where the load is removed by special devices which force the hay off of the rake teeth after the rake has come to rest.

If the Bean hay-rake were to be used in drawing hay to a stacker it would be unloaded by swinging the horses around and drawing the rake backward from under the load, precisely as stated in the Kenaga patent of the old stacker-rakes, upon which said patent describes an improvement. Indeed, the Bean rake is essentially what the Kenaga patent acknowledges to be old, and it does not contain anything corresponding in construction or function with the backing and guiding poles C C of the Kenaga patent.

The Rumrill patent shows a horse hay-rake intended to gather hay from the windrow and carry it to the stacker. The horses are hitched by ropes or chains to the outer ends of the axle journals, and the evident intention is that the rake is to be unloaded other-
226 wise than by drawing the rake backward from beneath the load, since the rake teeth are provided with elevated bars G, which are calculated to retain the load on the rake teeth C'. If these retaining devices were removed, however, so as to permit the rake to be drawn from beneath the load there is nothing present in the rake by which it could be backed by the horses, and the withdrawal of the rake would be accomplished by the reversal of the team in the manner set forth in the Kenaga patent as being practiced in the use of the old rake he there describes before the addition of his backing and guiding poles. As the Rumrill rake is actually constructed it shows a rather more primitive state of the art than that acknowledged by Kenaga as the basis of his improvement. It plainly does not contain his improvement or any suggestion of it.

The Swinnerton patent shows a horse hay-rake having a pole which, in drawing the rake forward, extends beyond the teeth far enough to allow the horses to be hitched entirely in front of the rake. In fact, as this pole is pivoted at its rear end so that the end of the rake may swing behind the horses, the team will be a considerable distance in front of the rake, unless, as is possible, the rake teeth are fully half the length of the rake head. Even then the horses will need to be far enough in front of the rake to allow them to clear the ends of the marginal teeth of the rake. The rake is discharged of its load by detaching the pole from a fastening adapted to hold it rigidly in front, which is done by a slight backing movement of the horses, and then swinging the horses and pole around behind the rake, and finally drawing the latter backward from beneath its load. To gather another load the horses are again reversed and brought to their position in front of the rake, and then
227 driven in advance of the rake teeth across the field. The

Swinnerton rake is essentially of the same class as that acknowledged by the Kenaga patent as old, the mode of unloading the rake being precisely the same, to wit: By drawing it backwards from beneath the load, as in the case of those rakes to which the horses are hitched at the ends, and which are drawn backward by reversing the team. There is this difference, of course, that the horses hitched on opposite sides of a central pole may be managed and guided by a single driver standing upon or behind the rake head, instead of requiring separate riders. It is evident from this patent that the inventor conceived the desirability of directing and managing the two horses by a single driver, and it is also evident that it was not obvious to him that separate outwardly directed guiding and backing poles could be employed for this purpose in conjunction with draft bars at the ends of the rake, and he therefore contrived ingenious mechanism of the pivoted pole, adapted to be made rigid with the rake in the forward movement of the latter. The patent speaks of a slight backing movement of the team to release the pole from this rigid position to allow it to be reversed, but it does not contemplate the backing of the rake from beneath its load; and it is evident that the rake could not be practically backed from beneath its load, for in a prolonged backing movement of the horses necessary to this end they would be brought against the mass of hay delivered by the rake, and, indeed, would need to be backed entirely over such mass of hay in order to clear the rake for turning preparatory to accumulating another load. The location of the stiff poles of the Kenaga patent at the ends of the rake, and their outward direction, whereby they may serve as guides and
228 guards for the horses in this position, seems to me peculiarly significant, in view of this Swinnerton patent, as presenting a novel and intelligently contrived means of providing at once for the management of two widely separated horses by a single driver, protecting them from injury by the rake teeth when under such single management from a point behind the rake, and for the backward movement of the rake from beneath its load without reversal of the team, which would otherwise be utterly impracticable by a single driver.

The Swinnerton patent, though containing a central pole, does not contain this invention of the Kenaga patent, and has not a means for backing the rake from beneath its load in a practical operation of the machine.

The Fowler patent shows a revolving horse-rake much like that described in the Wicks patent already considered. The rake proper is turned over to discharge the load, and after being turned over is dragged over the hay deposited thereby. It is pivotally mounted in the rear end of an open frame, to the front end of which is attached a central pole, on opposite sides of which the horses are hitched as to an ordinary wagon, and in this position they draw the rake forward both in gathering and delivering the load. The rake could not be used in connection with a stacker, because it is impracticable to back the horses over a pile of hay, as would be necessary to clear the team and rake of the load, preparatory to

another trip across the field. Moreover, in the case of some forms of stackers it would not be practicable to drive the horses far enough forward upon or over the stacker elevator to bring the load thereon, owing to the presence of uprights at the rear side of said elevator.

229 The Fowler patent is strictly a windrowing rake in character, though the patent states its object and purpose to be to gather the hay from windrows and carry it to a stack or other depository. This statement has reference to the mounting of a windrowing rake of this kind upon runners or a frame, which, in a measure, better fit it for the purpose of carrying a load from one part of the field to another. It is not itself a stacker, and, as already stated, is not adapted to work in conjunction with a stacker having an elevating platform, for the reasons given. The load adapted to be accumulated by this rake is stated by the patent to be large by reason of the adjunct of runners, but the method of unloading by tipping over the rake, as described in the patent, shows the intent to be to deposit the hay alongside the stack and not upon a stacking machine, but to be pitched to the top of the stack by hand. The Fowler rake is not of the class referred to in the Kenaga patent, as the basis of the improvement there described, and has not the mode of operation peculiar to said old class of rakes; much less does it contain the improvement or adaptation or mode of operation set forth as new in the Kenaga patent or any suggestion thereof.

The Nichols patent shows and describes a hay raker and loader in which a rake is mounted in a frame and upon wheels behind a cross-head or frame-work, to which a pole for the team is centrally attached and upon which the driver is seated. The whole raking mechanism is entirely behind the team and driver, and the relation of the horses, driver, and vehicle is altogether substantially that present in an ordinary double wagon. The patent says nothing about any special method of unloading, and so far as appears therefrom the load is to be pitched off as from an ordinary hay wagon.

230 The backing of the team is alluded to in the patent in connection with devices for lifting the front ends of the rake teeth clear of the ground when a proper load has been accumulated, a catching device being provided to hold up the front end of the rake when thus lifted by a short backing movement of the vehicle. This backing is not done in aid of or preparatory to the discharge of the load, but preliminary to drawing it across the field after the rake is filled. The rake is not capable of being used in connection with a stacker, because it cannot be backed out from under its load. Even if the rake-lifting devices were omitted the discharge of the load by backing the structure would be impossible, because the cross-frame at the front would strike against the load and prevent the machine from being cleared in that way from its burden. There would be, besides, the same fatal difficulty of backing the team over the load, mentioned in connection with other patents, where the horses are hitched in front, even if the front part of the machine itself were not in the way of such backing movement.

This Nichols patent, therefore, does not belong to the class of ma-

chines to which the Kenaga invention relates, and it has neither the element of side projecting draft bars by which horses may be hitched at the ends of the rake, nor any means whatever by which horses may be hitched at the ends of the rake to draw it forward in gathering a load, to back it from under the load, or to aid in guiding them in a working position at the sides or ends of the rake. The horses are evidently together hitched at the pole and driven by the ordinary cross check-reins, as in the case of horses hitched in the usual way to a common double wagon. I find no hint whatever in said Nichols patent of anything even remotely bearing on the subject of the Kenaga invention.

231 The Patton patent shows and describes another corn harvester of essentially the same character as the Currier and Whitney corn harvesters already considered. The horses travel directly in front of the vehicle wheels and the machinery is wholly behind them. The substitution of a rake in place of the corn-harvesting machine would bring the rake entirely behind the horses, and the machine thus changed would have absolutely nothing in common with the Kenaga invention or with the rakes upon which that invention is an improvement. It could not even be used in connection with a stacker, for the reason already stated in speaking of rakes having the horses in front—that is, because the horses cannot be backed over the load, and because, further, in most and probably in all stackers it would not be practicable to drive the team over the stacker platform.

The Patton patent, like the Carrothers patent, shows the horses hitched in separate thills instead of to separate poles, with space enough between the inner thills of each pair to allow the standing corn to pass between them to the cutting mechanism, the important difference from said Carrothers thills being that they are attached in the Patton patent to spring poles or beams reaching back toward the rear of the machine, which poles are intended to obviate the danger of breaking the thills by irregular movements of the horses. The Patton patent may be taken into account to correct the disproportionate drawing of the Carrothers patent in showing that the horses are separated only by a space of eighteen inches or two feet, or so as to travel on opposite sides of a standing row of corn. Like the Corrothers, the Currier, and the Whitney corn-harvester patents, the Patton patent affords not the slightest suggestion of the Kenaga invention. To my mind it is as

232 barren of such suggestion as is the Mason patent, which only shows two pairs of thills connected to each other, but wholly detached from any vehicle. If the Kenaga invention were merely for a duplication of poles or thills without respect to the vehicle or machine to which they were to be attached, the case would be different; but said Kenaga invention is for a particular combination of peculiarly arranged poles or their equivalents with other elements of a particular machine, whereby a new mode of operation in that particular machine was obtained in place of an old and wholly different and far less advantageous mode. To my mind it does not matter that Kenaga sought primarily to do in this machine what had

been done in other machines and vehicles, namely, to back it, or that he used generally the same means, to wit, stiff poles, that had been used in backing other machines and vehicles. It was necessary in his case to obtain something more than the merely backing functions of such stiff poles and to place such poles in different positions and in different relation to each other and to the machine from those previously known, in order to make them serve his purposes practically in this machine. By such peculiar arrangement Kenaga's poles become not merely backing devices but aids in guiding the horses, so that they could be driven, backed, and otherwise managed by a single driver, though said horses were separated by a distance of sixteen to twenty feet and had theretofore been manageable only by separate and independant riders. The Patton patent and the whole array of patents above considered showing poles and thills as merely backing devices in a variety of other machines, to my mind, have no more relation to the Kenaga invention than the detached thills of the Mason patent or the thills and poles of the various vehicles one daily sees on the street.

233 Int. 4. Examine "Defendants' Exhibit Perkins Patent" and state whether you have read and understand the same; also consider such patent in connection with the "Defendants' Exhibit Drawing of Perkins Patent," and state if such drawing correctly represents what Perkins describes, and whether the description and drawing together set forth the invention described and claimed in the Kenaga patent.

Ans. I have examined said Perkins Patent Exhibit and the drawing referred to in the question. The patent exhibit appears to be an English provisional specification without drawing or illustration, and the drawing I understand to be the production of some one who has read the patent and states that the drawing is made in accordance with said provisional specification.

While I can say that I have read and carefully read said provisional specification and understand the meaning of every word therein, I cannot say that I have a clear idea of the machine which said specification purports to describe, and, in my judgment, such specification is not a full and complete disclosure of any entire mechanism operative for the purposes therein stated.

I suppose the part of this specification which is thought to have a bearing on the Kenaga patent is the latter part, beginning "in order to elevate a cut crop from the ground on which it lies to a wagon or cart," and that more special reference is had to the statement which reads as follows: "The apparatus may be drawn by horses, one on either side of the fore end of the trough. They are harnessed in shafts or to poles which are there provided, or it may be worked by horses quite in front of the machine, but so far separated from each other as to allow of their walking one on

234 either side of the windrow of hay or corn which lies between them without trampling upon it."

The specification just before this passage clearly enough describes an inclined trough having an endless cross-slotted carrier traveling therein, but does not state whether the upper surface of the carrier

takes up the hay or whether the hay is pushed up on the bottom of the trough by the under surface or slats of the carrier. I would naturally suppose the latter construction and operation was meant, though not stated. The defendants' drawing of this supposed device indicates the contrary, inasmuch as the driving belt A is crossed. The patent also states that "inclined rake teeth are fixed at the front end of the trough and these points rest on the land." The location of these rake teeth is not further defined. Referring to the defendants' drawing, I should say that the red dotted line marked B would be their proper position, but that the full lines showing such teeth would not be their position in any case unless the carrier be trained over smaller drums than I would suppose likely to be used, and that the teeth would be still higher than such full lines if the hay is to ride on the top of the carrier.

The specification further says that "the lower end of the trough is supported on a caster wheel or wheels." In this statement the specification is more intelligible than the drawing, the latter showing no appropriate pivotal bearing or support for the bent arm of the caster wheel there shown. The specification further says: "The main carrying wheels of the elevator are underneath the trough and about midway of its length, or the caster wheels may be traveling wheels." What the last part of this statement means I have no idea. The caster wheels would of course travel with the
235 machine in any case, in the sense of progressing with it. If it means that the caster wheels may be substituted for the other wheels mentioned, then I cannot understand how the trough will be maintained in its poise or fall to run its forward teeth into the ground. Indeed, I cannot see how the machine can be operated even with both sets of wheels mentioned upon even slightly irregular ground, since the patent states that the points of the teeth rest on the land, for any elevation of the rear wheels or depression of the caster wheels would manifestly throw the points into the ground. The specification says of the main or carrying wheels that they are underneath the trough: not outside of it, as shown in the drawing. The patent says "the endless elevating chains," meaning those in the trough, are driven from the carrying wheel "by a driving band, rope, or chain." If the wheels are under the trough they would need to be provided with outer pulleys, or one of them should be provided with such a pulley on the outer end of its hub, probably, and not by the construction shown in the drawing. This, of course, is an immaterial discrepancy.

Coming to the statement I have quoted at length, as to the attachment of the horses, I think the position of the horses on opposite sides of the front end of the trough is clearly indicated by the language of the patent. They are said to be placed "one on either side of the fore end of the trough." I do not think this means in front of the machine, but at the sides of the machine, albeit I notice that the witness who produced this drawing, in speaking of various patent exhibits which I considered in my last answer and in which the horses were hitched in front of the sides of the machine, invariably stated that the horses were hitched "one at each side of the

machine." If his use of these words is a correct one, then the
236 horses would not necessarily occupy the position indicated by this drawing, but might be in front, say, of the sides of the trough or of the outermost rake teeth. While I think the position of the horses is correctly shown in the drawing, and while the specification says that "they are harnessed in shafts or to poles which are there provided," I find no description of any particular way of mounting the poles or shafts, so that for aught that appears in the patent the poles may be swivelled or they may not be poles at all in the sense of forwardly projecting shafts, but might be simply laterally projecting poles, to which the horses might be hitched by traces and whiffletrees, as they are hitched to the laterally projecting draft bars of the old form of rake acknowledged in the Kenaga patent. The word "poles" is not invariably used, even in connection with a vehicle or machine or in connection with use for attachment of horses, in the sense of a forwardly projecting shaft or a long shaft alongside of which horses shall be hitched, and in several of the patents which are made defendants' exhibits in this case the word "pole" is used to describe an entirely different device for the attachment of horses from a forwardly projecting shaft at the side of the horse or between the horses.

By consent of counsel the further taking of testimony is adjourned until Thursday, September 30th, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

THURSDAY, *September 30th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.
Present as before.

237 (Answer resumed:)

If the word "poles" in this statement of the Perkins provisional specification really means laterally projecting poles or bars to which the horses might be hitched, either by flexible traces and a whiffletree or by thills or shafts, laterally flexible, and without the aid of forwardly projecting poles by which to secure the horses' heads to aid in guiding them, which last-mentioned devices are not mentioned in the patent and would have no substitute or equivalent in the construction there described, said Perkins patent would not, in my judgment, be understood to set forth the Kenaga invention. The same would be true if the word "poles" refers to forwardly projecting bars, and if such forwardly projecting bars were swivelled, pivoted, or even if said poles were rigidly fastened in some undefined way and did not have the characteristic of outward projection which is given to the Kenaga poles in the Kenaga patent. There is no provision made in this Perkins specification for managing the team by means of a single driver when hitched at opposite sides of the front end of the trough, and no intimation given that the horses would not be controlled by separate riders, or that they might not

be swung around to pull the machine backward, in case such a movement of the machine were necessary.

The patent, however, says nothing about any necessity for backing the machine, and in the normal use of such machine for the purpose of elevating hay stated in the patent there would be no need for backing it.

Whatever the form of the draft contrivances vaguely and imperfectly suggested in the words "the apparatus may be drawn by horses one on either side of the fore end of the trough; they
238 are harnessed to shafts or poles which are there provided," it may, I think, be fairly understood that such devices will be the full equivalents and would have the same mode of operation as in the case described in the next following words as follows: "Or it may be worked by horses harnessed quite in front of the machine, but so far separated from each other as to allow of their walking one on either side of the windrow of hay or corn, which lies between them, without trampling upon it." In such advanced hitching of the team I should suppose they would naturally be attached to the sides of the trough by separate chains, and that the horses would be separately ridden and managed, if at any considerable distance apart. This, of course, is altogether conjecture, as indeed the whole matter of how the horses were hitched by Perkins, in any case, is conjecture, since the patent is wholly wanting in description of any complete mechanism for hitching the team in either position to the machine. The method had in mind by Perkins for hitching and managing the team with respect to whether or not the horses are concerned in guiding the machine, is placed still further in doubt by the concluding words of the specification, which are as follows: "Provision may be made for steering the machine independent of the horses by a lever or other steerage appliance connected with the caster wheel or wheels." These words seem to indicate that the horses, however he may have intended to hitch them, were not to be relied on or concerned in guiding the machine. Altogether, the whole description of the Perkins patent with respect to the manner of hitching the horses and managing them is so inadequately stated in the patent that I am wholly unable to make out from said patent what Perkins intended in the matter, or indeed, whether or not he had any well-defined
239 intention or plan whatever for practically connecting and managing the horses. He certainly does not define outwardly projecting poles, which is the form specified and necessary in the Kenaga patent, nor in connection with thills does he specify draft bars and poles to which to hitch the horses' heads as an aid in guiding them, so that separate riders may be dispensed with and the team successfully managed and backed by a single driver. Perhaps it may be fairly supposed that in the use of the thills suggested in the Perkins patent he contemplated projecting bars of some kind with which to connect said thills; but even if this be assumed, the poles to which the horses' heads would then require to be hitched as an aid in guiding them, if in some undefined and not apparent way they were to be managed by a single driver, are not pro-

vided in the Perkins patent, and such thills without the poles and without separate riders for the horses would, it appears to me, be wholly impracticable. I therefore fail to find in the Perkins provisional specification any description of the matters set forth in the Kenaga patent as constituting the invention there described and claimed.

It may be further remarked that the hay-elevating machine of the Perkins patent is manifestly not a rake of the class to which the Kenaga invention relates, and is not adapted for the accumulation of hay and the delivery of the same to a stacker elevator. It corresponds rather with a class of ditching machines in which the material scooped up at the front of the machine is elevated and carried over it. While, however, the Perkins machine is intended for hay and grain gathering, it no more suggests the Kenaga invention than one of this class of ditching machines would do whereunto the horses are hitched to travel on opposite sides of the ditch.

240 It may be further remarked that the Perkins patent clearly does not locate the horses in any case at opposite sides of the rake proper, as in the Kenaga patent. In one case the horses are said to be "one at either side of the front end of the trough," and this trough is at the rear of the rake teeth. In the other case the horses are said to be located "quite in front of the machine;" in which case, also, the rake would not be between them, as in the Kenaga patent. In no case, therefore, does the Perkins patent locate the horses in the position where they work in the machine described and claimed in the Kenaga patent. As to the position of the horses if located one at either side of the front end of the trough, the Perkins machine would apparently more nearly correspond with the mowing machine shown in the Roney patent, though there would be in the Perkins machine no provision for hitching the horses forward, as there is in the bars C of said Roney patent.

Referring to Defendants' Exhibit Drawing of Perkins Patent, with respect to the position and attachments there shown for the thills or shafts, I do not find in the patent itself anything descriptive of the cross-bar to which the said thills are connected, or of the double connection for each pair of thills shown in said drawing. A cross-bar may be fairly supposed to be present, but not the double attachment of a pair of thills. My understanding would be that the thills would be attached with connections that are laterally flexible, and that separate riders would be employed for the horses in this position.

Int. 5. State whether or not, in view of the prior art as shown by the various exhibit patents of defendants and the well-known

241 use of tongues or thills for attaching horses to vehicles as the same existed at the date of Kenaga's patent now in controversy, the rake described and claimed in said Kenaga patent could then have been produced by the ordinary skilled mechanic without the exercise of invention, giving your reasons for any opinion you may express.

Question objected to for the reason that it calls upon the witness to decide one of the controverted points of the case.

Ans. In my judgment it could not, for the reasons, first, that the difficulties attending and objections resting against the old construction and mode of operation in this class of rakes existed for a long time in the very presence of the ordinary forms of backing poles in daily use by the very men who also used said old forms of rake and experienced the difficulties attending them; second, the old forms of backing poles and thills as used in other vehicles are not adapted to use in connection with this old class of hay-rakes without change as to the poles or without the accompaniment of poles for use with the thills; third, though I have had some personal experience in driving horses to farm implements, it would, I believe, not be readily apparent to me, as I believe the testimony shows it was not apparent to others experienced in handling horses, that two horses separated by a lateral distance of fourteen to twenty feet could in any way be hitched and driven by a single driver immediately behind and between them, as in the Kenaga improved rake, and, fourth, the conception of the entirely new mode of operation resulting from the Kenaga improvement, taken in connection with the peculiar features of construction which characterize the backing devices he describes in his patent, to my mind clearly indicate all the conditions of invention as distinguished from mechanical judgment.

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Under the head of the second reason above given I point out that the backing poles used with common wagons and other double-team machines, and even the duplex poles for slightly separating the horses of corn-harvesters as shown by defendants' patent exhibits, and, in fact, all backing poles that I ever saw or heard of, project directly forward from the vehicle. To attach a pole in such a position or direction to the end of this class of horse hay-rakes would not be practical for all the purposes contemplated and provided for in the Kenaga patent. It is also necessary that the poles shall serve the purpose of guarding the horses from encountering the rake teeth at his side, and also that they shall assist in guiding the horses under the new condition of their being driven by a single driver, when separated by the great distance here present between them. The Kenaga poles are therefore something more than merely forwardly projecting devices for the sole purpose of backing the rake; they are also contrived to serve as such needful guards and guides for the team. To this end they differ from the previously known poles which projected directly forward and are arranged to project upwardly and outwardly from the rake head, or in a wholly new position or direction, whereby they perform all these several functions in a wholly new combination with the teeth of the rake. This new position of the poles at the end of the rake, taken in connection with the new direction of the poles, whereby they are rendered practically operative in such combination with the rake teeth and with the draft bars on the rake, resulting in a wholly new mode of operation and management of the horses, in my judgment, involves invention and is not obvious to the mind of a mechanic, in view of the previously existing pole and other merely backing devices of vehicles and machines.

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Int. 6. Examine the Exhibit Defendants' Rake, in connection with the Kenaga specifications and the statements made by defendants' witness, Bates, in his answer to interrogatory 8, touching the question of infringement, and state whether or not you are still of the opinion, heretofore expressed, that the construction of rake after the plan of said model exhibit is substantially the construction described and claimed in said Kenaga patent.

Ans. I have made the examination called for by the question and am still unhesitatingly of the opinion that the defendants' rake clearly contains the construction and has the mode of operation set forth and claimed in the Kenaga patent. The only difference that the defendants' witness who is referred to in the question appears to find between the Kenaga patent and the defendants' rake is in the hinged and braced attachment of the poles in said defendants' rake, whereby said poles may have a limited vertical movement, such as is common in poles as previously applied to wagons and other machines. It is true that this difference exists, and, so far as I am able to judge, this difference appears to be attended with some advantages on the part of defendants' rake over a pole attached rigidly to the rake head, as shown in the Kenaga patent drawings. I do not say distinctly that that there is such an advantage, because I have no practical experience in handling these two rakes in the field, and am not, therefore, qualified to speak intelligently on this point further than that on general knowledge I should say that a
244 limited vertical movement of the poles as provided in defendants' machine will be found in a degree useful. I do, however, say that the poles in defendants' machine have laterally the same rigidity as the Kenaga poles, and that for backing purposes and for the guidance of the horses and for guarding them, with respect to the rake teeth the poles of the defendants' machine operate precisely in the same way and are substantially identical with the Kenaga poles. The defendants' poles are no less stiff poles because hinged—that is to say, in the sense in which the word "stiff" is obviously applied to the "poles" in the Kenaga patent, when the poles there mentioned are to receive the backing strain. In both machines the poles stand in substantially the same upwardly and outwardly inclined direction, so that backing strain applied to them would naturally tend to bend them. To meet this indirect strain, not in the line of the pole itself, but obliquely to said line, the poles in both machines are required to be and are stiff. In the Kenaga patent they are shown as being made each of a single piece of timber, while in defendants' machine they are made in two pieces which brace each other. The constructions are the commonest equivalents of each other, and as lateral rigidity of the pole with the rake head is all that is required of their connection, and as the defendants' poles have such rigidity practically the same as the Kenaga poles, I see no essential difference between the poles of the two machines with respect to the purposes of the Kenaga patent.

Nothing said by defendants' witness, Mr. Bates, as to the advantage of slight vertical movement on the part of the poles which, another of defendants' witnesses has said, I believe, is intended to be

always present to a limited extent in defendants' machines,
245 has changed the opinion I formerly expressed as to the substantial identity between the poles of defendants' model and the poles described and claimed in complainant's patent, and I still find in said defendants' machine the invention described and claimed in the said Kenaga patent.

Cross-examination by L. L. BOND, Esq.:

X Int. 7. The Kenaga patent has in it a little more than the statement that the poles are to be stiff, has it not, inasmuch as the statement is "C C are stiff poles secured permanently or removably to the ends of the rake head?"

Ans. It has the statement quoted in the question.

X Int. 8. Do you not understand that that statement carries with it the element of rigidly attached—the drawing showing a rigid attachment?

Ans. I do not.

X Int. 9. You drew the Kenaga specification, did you not?

Ans. I did.

X Int. 10. When drawing the specification what did you understand the words quoted to cover or mean?

Ans. That the poles could be applied so as to be detachable or so as to always remain on the machine.

X Int. 11. Do you understand the word "stiff," as there used, to be simply a quality inhering in the material of which the poles are made, or that the stiff was to exist in the relation of the poles to the rake?

Ans. I understand it to apply to the quality of rigidity in the pole itself, the idea of proper rigidity of the connection thereof with the rake head not being expressed in words, but assumed and indicated sufficiently in the drawing. The pole must have, as a matter of course, a laterally rigid or substantially rigid connec-
246 tion with the rake head or else, by reason of its lateral inclination, it would yield and swing around with the horse in backing instead of serving to back the rake. Such a connection of the pole with the rake is shown in the drawing.

— Int. 12. The specification states that "C C are stiff poles secured permanently or removably to the ends of the rake head and, as here arranged, directed forward, upward, and outward therefrom." Emphasizing the words "as here arranged," would you not understand that the upward and outward direction of the poles was a non-essential, while it might be the best, form?

Ans. I should understand from the emphasized words that possibly at the time I drew this specification I may have thought of some other form that could be given to the pole with equivalent effect without its falling precisely within these terms, as, for example, a pole which might be used, of curved form possibly, which would proceed first in a lateral direction upwardly and outwardly and thence forwardly. The words actually employed in the patent, to wit, "directed forward, upward, and outward therefrom," indicate

rather a straight pole, such as is shown, which proceeds directly from the rake head to its free end in exactly the course denoted by these words.

X Int. 13. Referring now to Complainant's Exhibit Acme Hay Rake Model, if the blocks to which the draft poles are attached in said model were carried high enough, so that the front end of the tongue would be in the proper position while the body of the tongue was in a plane parallel with the rake teeth, so that it had no upward direction, would not a rake so made contain the Kenaga improvement?

247 Ans. I understand the question to suppose the front end of the poles to remain in their present position—their rear ends to be elevated—and that they have the same outward inclination as now shown in the model. With this understanding, I answer that I think it would, unless such elevation of the rear end of the tongue would allow the horses to get onto the rake, in which case it would fail of this purpose and defeat the practicability of the machine. If this were the case the insertion of an under brace in the present position of the tongue would remedy the defect and it would be the Kenaga invention.

X Int. 14. Assuming the point of the tongue to be three feet above the ground, which I do, from having measured a full-sized machine at the fair ground, the height would not be sufficient to let the rear end of a horse onto the rake teeth, would it, even if the horse was not retained in position by the draft tugs?

Ans. I cannot definitely say, but should think such rear elevation of the tongue would be less desirable than its lower position at this point, inasmuch as the horse in backing slacks the traces, and not only is free to move sidewise in the rear, but often does so.

X Int. 15. Assuming the rake to be in the form supposed in X Int. 13, and as understood by you, would the rake in that form be any more liable to tip in backing than it would in the form shown in the Acme hay-rake model?

Ans. I think not. The tendency to tip depends on the angle with the ground of a straight line drawn from the wheel axle of the rake to a point on the front end of the pole to which a horizontal rearward strain is applied. The front end of the pole remaining at a constant height, the longer the pole the less the tipping tendency will be, and the greater the proportion of horizontal

248 force that will be resolved into backing strain. On the other hand, the shorter the pole the greater the tipping tendency, until finally, if there be no pole at all and a horizontally acting force be applied directly to a vertical standard rising from the wheel axle, the whole tendency of the force will be to tip the machine.

X Int. 16. If the front end of the pole was carried above the breast strap of the horse applying the backing power, the tendency then would be to tip forward instead of backward, would it not, at least to some extent?

Ans. It would not tend to tip forward at all, unless the line of rearward strain were directed below the axle. If such line of strain be not horizontal, but between the horizontal and a line drawn from

the front of the pole to the axle, it would, in a degree, lessen the backwardly tipping tendency, but would not tend to tip the rake forward.

X Int. 17. If the poles of a Kenaga rake were carried up as high as the horses withers and backing power was applied to such poles, would not the tendency be to hold the front ends of the teeth down, rather than to elevate them?

Ans. That will depend on a great many conditions not named in the question—primarily upon the direction the breast straps will assume when the horse is under backing strain, and this will obviously depend on the length of the breast straps, for plainly the longer the breast strap the less will be its inclination from the horizontal, and the shorter the breast strap the more nearly it will approximate to the vertical.

249 X Int. 18. Does not Kenaga leave the attachment of thills to the skill of the constructor, in case the suggested modification is to be applied?

Ans. He does.

X Int. 19. Does not the specification squarely state that a pair of thills connected with each of the arms B B will be the equivalent of the two poles shown and described?

Ans. If the question means that that is the statement of the patent, without respect to the following and thereunto-connected statement that poles will be advisable to aid in guiding the horses when the thills are used, it does not. A period separates the statement referred to in the question from the sentence next following in the patent, but the word "however," in the sentence following the period, connects said sentence with the preceding one precisely as though the word "however" were omitted and the word "although" were substituted in place of the period, and the two sentences thus connected are parts of the one entire statement respecting the use of thills as the equivalents of poles. My connection with the drafting of this specification has been referred to, and I may therefore add that my recollection is that I had drawn the specification without the second sentence referred to, and that Mr. Kenaga stated, and desired me to insert this statement, that if thills were used adjunctive poles to aid in guiding the horses would be necessary. I think, therefore, that the full statement of the patent respecting the use of thills is that poles to aid in guiding the horses are advisable to be used in conjunction with said thills in order to obtain all the results obtained by the poles C C.

X Int. 20. Do you not understand that the word "advisable"
250 is merely a recommendation as to the best mode of using rather than as a statement that the poles are necessary or essential when thills are used?

Ans. It is in any case, in my judgment, full advice and instruction to the public as to how the patentee intended his invention to be constructed and used. It perhaps may not be regarded as expressing an imperative necessity of the part advised to be employed.

X Int. 21. Under the statement of the section of the specification referring to thills that the horses' heads are to be hitched to these

supplemental poles when used, would you not understand that the thills were the instrumentalities to be used in backing the rake?

Ans. I would so understand, and they undoubtedly would be the media of the backing force.

X Int. 22. This, then, would reduce the polls to the mere office of guiding the horses' heads, which might be carried across from head to head like the old jockey stick.

Ans. No. The old jockey stick would merely keep the horses' heads at a constant distance apart, but would not keep either horse off the rake or in any other way assist in guiding them, with respect to the rake, further than to prevent more than one horse being entangled in the rake teeth at the same time.

X Int. 23. Do you find anywhere stated in the specification that the poles C C are to be used for guiding the horses except in connection with thills?

Ans. I do not; but to my mind the statement of such use of poles in connection with thills clearly implies that the stiff backing poles C C, having the horses hitched forward thereto, were intended so to operate. Moreover, any one acquainted with horses would know from the instructions of the patent as to how the horses were to be
251 hitched to the poles C C that said poles would inevitably aid in guiding them.

X Int. 24. The statement in lines 52, 53 is that the horses are to be hitched thereto by a breast strap, while in lines 74, '5, where the poles are used to supplement thills to aid in guiding the horses, that they are hitched by their heads. Would any one understand from this that the first mode of hitching was to be used in guiding the horse?

Ans. I think so, manifestly. I think the statement relative to the use of supplemental poles to aid in guiding the horses when thills are used clearly shows that the inventor thought that thills alone would not do all that the stiff poles C C would do, and that that thing which the thills would fail to do and the stiff poles would accomplish was to aid in guiding the horses. The implication seems clear to me that the poles were expected to aid in guiding the horses, and that the thills alone would not do it; wherefore the inventor says nothing about supplemental guides in connection with poles, but does instruct their use in connection with thills.

By consent of counsel the further taking of testimony is adjourned until Friday, October 1st, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

FRIDAY, *October 1st*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.
Present as before.

X Int. 25. Is it your understanding that a simple and ordinary attachment of the horse to a pole by a breast strap serves as a guide for the horse?

252 Ans. Applying the question to the Kenaga pole, it is evident to me that the pole itself and the attachment of a horse thereto by a breast strap will serve to guide the horse to the full extent contemplated by said patent.

X Int. 26. As thills ordinarily project beyond the collar of the horse harnessed therein, why would they not guide the horse better than a single pole on one side only of the horse?

Ans. Thills as commonly constructed stand close to the horse on either side, and the usual way of hitching the horses in the thills for backing purposes is by thill loops connected with the harness saddle, though sometimes, in addition to such thill loops, backing traps are used connected with the breeching. Such thills cannot be appropriately made rigid with the rake head or with the draft bar, because they would not allow for the lateral movement of the horse incident to even his most regular forward movement without breaking the thills or their connection with the draft bar. Especially would they be too confining for the horses, and would be liable to break in this case, where two horses are hitched so remotely from each other and each entirely independently of the other. No mechanic, I think, with ordinary judgment, would for a moment think of attaching ordinary thills rigidly to the draft bars, but he would naturally attach them to a flexible connection. Flexibly attached they would, of course, not serve at all to guide the horse, either for his own independent movements or to meet the movements of the opposite horse. Whether rigidly or flexibly connected with the draft bars, ordinary thills would therefore be unsuited to aid in guiding the horses in this machine.

253 X Int. 27. When you speak of flexibly attached in your last answer do you mean anything more than the ordinary vertical flexibility?

Ans. I do, of course. Mere vertical flexibility would not remove the liability of breaking, because the thills have substantially the same lateral rigidity in that case, which is in the way of those necessary but lateral movements of the horses, from which would arise the danger of breaking the thills. I referred in my answer to lateral flexibility, such as is common, for instance, in the attachment of thills or poles to a horse car.

X Int. 28. Did you ever see or hear of a pair of thills having any lateral movement in any vehicle which run freely upon the surface of the ground and did not have a track to control the movements of the vehicle?

Ans. I never heard of any other. They all have such movement, but it is commonly provided, as in a wagon, in the axle to which the thills are attached; and, by the way, in such vehicles as have poles and thills running otherwise than on a track the thills are not employed to guide the horse, but they are the medium by which the horse guides the vehicle.

X Int. 29. As we were considering the question of pivotally connecting a pair of thills to the draft bar, as in a horse car, which has a track to direct the vehicle, and my question was as to the applica-

tion of such thills to vehicles running without tracks, do you consider your last answer a proper one?

Ans. The question distinctly asked as to the lateral movement of thills on vehicles other than those guided by a track, and I consider the answer a proper one, as giving the exact facts. If the question is whether I have seen thills attached with lateral flexibility to the front axle of a road wagon, I never have.

254 X Int. 30. What other or different movements does a two-wheel horse-rake have from that of the axle of a cart or the front axle of a wagon attached to the rest of the vehicle by a king-bolt?

Ans. As to the rake head, no other. As to the rake teeth, they have a very different movement from any part of a road wagon.

X Int. 31. If thills were attached to a horse-rake (a pair at each end) by a device permitting a free lateral movement of the draw bar, would not the control and guidance of the rake be largely lost?

Ans. If no other device were employed to aid in guiding the horses and if separate riders were not employed the means for guiding the horses, and through them guiding the rake, would in that case be incomplete.

X Int. 32. Is it your opinion that this incompleteness would be restored by hitching poles to to the horses' heads, as suggested in the the Kenaga patent?

Ans. It is.

X Int. 33. Then we would understand, would we not, that very little power was required at the outer end of the poles to guide the rake?

Ans. When hitched to the horses' heads, yes; or, at least, less than when hitched only to their breast straps. The question, however, implies a misapprehension of the use of the poles. The Kenaga patent does not say they are to be used in guiding the rake, but "to aid in guiding the horses." The rake, I understand, is principally and necessarily guided by slowing one horse or hastening the other, and the poles serve to aid in guiding the horses one from the other through the medium of the rake structure, when

255 the rake is so guided or varied in its course. The same is true in the operation of backing the rake.

X Int. 34. In the gathering of hay one of the principal objects to be attained is guiding and controlling the rake, is it not?

Ans. Yes.

X Int. 35. And this you think is accomplished by varying the speed of the horses rather than by the use of the pole, do you not?

Ans. The turning of the rake or the changing of its course I understand to be accomplished by varying the speed of the horses, and that the poles serve to keep the horses in their proper relation to the rake in these movements.

X Int. 36. What do you understand by the statement in the specification "having the reins split back to a point in convenient reach?"

Ans. I understand that the reins, running directly from opposite sides of each horse's bit, are thus brought into the reach of the driver, standing or riding centrally behind the rake head.

X Int. 37. Or, in other words, that the driver has practically a pair of single reins for each horse?

Ans. Yes.

X Int. 38. If a rake should be constructed with the Kenaga poles C directly over and in line with the outer rake teeth and the front irons *c* were made longer, so that their outer ends or hooks would be in the position shown in the Kenaga patent, would a rake so constructed, in your opinion, contain the Kenaga improvements, the other parts of the rake being constructed as shown in said patent?

256 Ans. That would depend entirely upon the scope which the court shall give to the patent. If the court shall restrict the patent to poles having all the functions of the poles C C, as shown and described in the patent—that is, serving not only for backing the rake but for aids in guiding the horses and for guarding the horses against entanglement with the rake teeth, by reason of their position outside of the rake teeth—then the construction set out in the question, as I understand it, would not fall within the patent; but if the court shall decide that it was not obvious that poles of any kind could be applied to such a rake whereto the horses are hitched from sixteen to twenty feet apart, and thereby obtain a new system and mode of operating the team and managing the rake, and if by the addition of something not specified in the question or by some special modification of the poles suggested in the question, the horses can be controlled, guided, and guarded thereby by the devices mentioned in the question, then it would follow, I think, that such construction would be included in the patent. I don't think that the devices exactly as mentioned in the question would serve all the purposes of the Kenaga poles C C or be practicable devices for this class of rakes, and therefore I do not think they would contain the Kenaga invention.

X Int. 39. A rake of the construction supposed in the last question would serve the purposes of dispensing with boys to ride and of backing the rake, would it not?

Ans. It would not serve to dispense with the boys and independent riders unless it would be made effective for keeping the horses off the rake and to aid in guiding them.

257 X Int. 40. If, as has been heretofore testified in this case, a horse would learn in an hour or two to keep away from the pole, would not the supposed construction be sufficient to keep the horse off the rake?

Ans. That would not follow. The pole has to be there for the first hour or two to teach the horse to keep away from it subsequently.

X Int. 41. If the horses were twenty feet apart on a twelve-foot rake they would not be very near the poles any way, would they, and would have to depend on the breast strap for guidance, in so far as there was any guidance, would they not?

Ans. They certainly would not be very near the rake and the breast strap would probably act in guiding the horses.

X Int. 42. Now, if you gave the same liberality of distance by an extension of the iron hooks *c* outward to keep the horse off the rake with a pole directly over the outer tooth, why would not the breast strap guide him in that form as well as an outward inclined pole that did not reach the horse?

Ans. I note, first, the absurdity of making that iron hook four feet long. It could be made that length by inserting a diagonal brace behind it which would have substantially the inclined position of Kenaga's pole. Next, if the long hook were used without such a brace there would be nothing to strike the horse, as the Kenaga pole does, and teach him in a hour or two, as the Acme of Kenaga pole would do, to govern his own movements by those of the rake pole, the end of which would be in his sight. Lateral pressure upon the collar derived from the breast strap might certainly operate as a sufficient force to swing the horse around, but it would not be calculated to teach him, as the side pole would do, to adjust his own movements to those of the rake.

258 X Int. 43. Why would two riders be any more necessary when the poles are extended outward by means of front irons than they would be when the outer point has its position located by partly inclining the pole itself outwards?

Ans. Because the poles are not in proper position themselves to keep the horses off the rake teeth and the riders would be needed for this purpose. I should suppose—I don't understand that in a twelve-foot rake the horses are twenty feet apart.

X Int. 44. Is there any other length of rake mentioned in the Kenaga patent than "about twelve feet," and have you not repeatedly stated that in this rake the horses are from sixteen to twenty feet apart?

Ans. The Kenaga patent speaks of the rakes of the class there referred to as being about twelve feet long. The testimony shows that this class of rakes are often much longer, I believe, so that the horses sometimes stand twenty feet apart. I have spoken of their standing from sixteen to twenty feet apart, but had in mind rakes of different length.

X Int. 45. A rake having the supposed construction of locating the poles over and in line with the outer teeth and the ends carried outwards by means of iron hooks could be backed, could it not, and managed by a single driver having the reins arranged as stated in the Kenaga specification?

Ans. It could be backed, undoubtedly—that is, the backing force could be made to act through the poles thus constructed; but whether the horses would be kept off the rake in backing or would be properly guided in other movements of the rake I am unable to say.

259 X Int. 46. These rakes are light and easily backed, even when loaded, are they not?

Ans. They are made as light as practicable, but I do not know,

even approximately, what amount of backing strain is necessary to carry them from beneath the load.

X Int. 47. Referring now to the Perkins English patent and the Exhibit Perkins Drawing, the rake teeth would work in connection with the elevator in either position shown by the upper black lines or lower red lines, would it not, with the simple difference between an open and a crossed belt for driving the elevator?

Ans. As to the alternative positions shown, they would serve with the change in the driving belt mentioned in the question.

X Int. 48. The specification stating that the apparatus may be drawn by horses, one on either side of the fore end of the trough, and that they were to be harnessed in shafts or poles there provided, would not any skilled or even ordinary mechanic understand how to provide shafts or poles to attach the horses in those places without being further directed?

Ans. As to poles I have not now, after careful reading of the patent and reflection, been able to determine in what manner suitable poles could be provided at these points, if by poles is meant backing devices, but they are not referred to in the patent as backing devices, but something to hitch to. Even when forwardly projecting poles are used they are not the parts to which horses are hitched for draft purposes, and it is therefore not even certain that the poles mentioned in the patent as being provided at the sides of the front end of the trough are poles at all of this description. As to the
260 attachment of thills, I think a mechanic would understand that laterally projecting bars would be required, and, of course, he would understand how thills might be attached to such bars, as, for example, in one way as shown in this drawing. He might also attach them in other ways than as here shown, and, if a skilled mechanic, would certainly do so, for the attachment here shown is, in my judgment, entirely impracticable. To connect thills or poles in some way which shall have some one of several different modes of operation would fall within the skill of a skilled or even ordinary mechanic.

X Int. 49. Perkins uses the word "harnessed" instead of "hitched," does he not?

Ans. I find by reference to the specification that he does.

X Int. 50. If you was drawing a specification for some improvement in a cart, and which in no way related to the draft devices, would you not think it sufficient in this respect to say that the vehicle was to be drawn by horses harnessed in shafts or poles to be there provided, the method of attaching and using poles and shafts being so very old that it would be entirely safe to leave this matter of harnessing to the skill of the constructor?

Ans. I would, because in that case nothing unusual would be intended relative to the position of the horses or the mode of operation of the thills or pole.

X Int. 51. You would not think it necessary to state that the thills or poles were to be used for backing purposes, would you, if they were to be attached to any form of vehicle?

Ans. No; unless the backing was to be in some way modified by

the thills or pole or unless thereby a backing movement might
261 thereby be given to the vehicle, which had theretofore not had such a movement or to which such a movement had theretofore been given by some other means.

X Int. 52. Is not the ordinary use of poles and thills for backing purposes and for preventing the vehicle from running against the horse when you desire to stop?

Ans. Those are among the usual functions of poles and thills, another being to guide the vehicle by change in the direction of the horse or horses.

X Int. 53. When a horse is properly harnessed in thills or poles, does not such harnessing include hitching at the front, so that these functions may be performed and the thills or tongue kept out of contract with the ground?

Ans. If the poles meant are of the forwardly projecting kind, answering to the tongue of a wagon, the proper harnessing of a horse thereto and to thills would involve commonly the forward attachment of the horses thereto. Both tongues and thills are, however, so secured to the vehicle as not to require vertical support at their outer ends by any attachment to the horse.

X Int. 54. Do not the Defendants' Exhibits Currier Patent of 1860 and Mason Patent of 1865 show that duplex poles and a separate pair of thills for each horse were a part of the art as it stood in 1868?

Ans. Yes.

X Int. 55. Would a skilled mechanic have any difficulty in attaching the Currier poles to the Perkins rake and by hitching whiffletrees to the cross-bar shown in the Exhibit Drawing of Perkins Patent, as they are hitched to the projecting bars in the Kenaga patent, would he not have an operative device so far, at least, as the draft devices are concerned?

262 Ans. There is nothing described in the Perkins patent concerning the frame or other structure that affords any such means of attachment for the duplex poles as are shown in the Currier patent, and in my judgment it would require something more than the skill of a mechanic to so far complete the only vaguely mentioned structure of the Perkins patent as to enable the Currier poles to be secured thereto. To fasten the poles to the sides of the trough as they are fastened to the frame in the Currier patent would carry the horses further forward than the position assigned them in the Perkins patent, and, besides, such attachment to the trough would, for other reasons, be unsuitable. Adding something that would be necessary, but which is omitted from the Perkins description to which to attach the poles and adding also draft bars, which, too, are not mentioned in the Perkins patent, and then adding the Currier poles would give an operative device, so far as draft purposes are concerned.

X Int. 56. As illustrating one form of the machine which Perkins proposed to improve, I now show you the hay-loader patent No. 7277, to B. M. Townsend, dated April 9, 1850, and ask you whether,

with this illustration of the prior art, you would have any difficulty in understanding the Perkins specification?

Ans. I do have the same difficulty I had before. The Townsend patent contains nothing that supplies any of the deficiencies of the Perkins patent. The Perkins patent, however, mentions certain parts which are unlike anything in the Townsend patent, and in view of the differences positively suggested by Perkins, the same being inconsistent with the Townsend instruction, the omissions of the Perkins patent remain equally fatal to it.

X Int. 157. What do you mean by "fatal?"

263 Ans. I mean that the Perkins patent falls so far short of describing any complete and practically operative mechanism that, in my judgment, it amounts to no description at all.

X Int. 58. Perkins says: "I employ an elevator consisting of a trough-like frame, having, as in an ordinary elevator, pulleys at each end of the trough, around which endless chains pass. These chains carry cross-laths with teeth upon them which travel along the trough. The trough is erected in an inclined position, and with its lower end foremost it is drawn over the land. Inclined rake teeth are fixed at the front end of the trough, and these points rest on the land." So far, would there be any difficulty in constructing the machine, and could not a skilled mechanic follow the directions up to this point?

Ans. A skilled mechanic could make the matters so far recited.

X Int. 59. He continues: "The lower end of the trough is supported on a caster wheel or wheels, but the main carrying wheels of the elevator are underneath the trough and about midway of its length." Would you find any difficulty in adding these features to the elevator and rake teeth previously described?

Ans. With the expectation of making an operative machine, I should have a fatal difficulty in adding those features without the exercise of invention. With the points of the teeth resting on the land at some distance in front of the trough, and with those teeth "fixed" to the trough, as the patent says they are, I should be utterly at a loss to know how to mount the structure on two sets of wheels, one behind the other, and both back of the points of the

264 teeth which rest on the land, so as to have a machine that could be drawn over a ground surface having the usual irregularities without plunging the teeth into the ground. The Townsend teeth are pivoted to the elevator frame to meet this very difficulty, but the Perkins patent says they are "fixed" to the trough and "rest on the land."

So far as the question goes, nothing is said about the kind of frame-work necessary to support the trough from the caster wheel or wheels and from the carrying wheels, but I believe that further on in the patent something is said in the most general terms about there being a frame. A mechanic in making a frame for such connection would, in the exercise of mechanical skill only, make a machine that would run into the ground. I have myself invented a way by which this could be obviated, and that would be by making a frame on which both the caster wheels and the carrying wheels

would be mounted, the frame having no connection with the front end of the trough and the trough being supported at the rear from the carrying wheels only, so as to rock on the journals of said carrying wheels, and the front end of the trough being supported wholly by the teeth, made curved on their under side so as to slide on the land. The teeth, the caster wheels, and the carrying wheels would then all three rest constantly on the ground, notwithstanding its unevenness, and the proper distance would be maintained between the pulleys carrying the driving belt in any rocking movement of the trough upon the journals of the carrying wheels. In this construction also the caster wheel, being always on the ground, could be made to serve for steering the machine as suggested in the patent. Some such construction as I have above suggested would be necessary to make a practically operative machine consistently with the
265 statements of the Perkins patent, but no such construction, and no other construction that is practical, is described or hinted at in said patent.

In the construction I have described, the caster wheel would not support the front end of the trough, but the front end of the frame. So far as I can see, no construction can be employed in which the caster wheel can be used in supporting the front end of the trough continually, so that it might serve as a steering device, while fixed teeth are employed resting on the ground, as stated in the patent.

X Int. 60. As you have already stated that you have no practical experience with hay-rakes, will you now please answer the previous question, leaving out all points of field operation and your own inventions?

Ans. In the first place, I have not stated that I have had no experience with hay-rakes, for I have. I would have no difficulty in putting a caster wheel under the front end of a trough and none in putting carrier wheels under the middle of the trough.

X Int. 61. Perkins continues: "A frame-work connects these wheels with the trough, and from them, by a driving band, rope, or chain the endless elevating chains are driven." Would a skilled mechanic have any difficulty in applying or supplying these parts?

Ans. A skilled mechanic would quite likely ask what kind of a frame was wanted, and if he were aware of the purposes of the machine and felt called upon by this description to make a frame that would give a working machine I think he would stop right here because insufficiently instructed by the specification.

X Int. 62. The instruction of the specification is as follows:
266 "The crop, as the machine meets it, raises up inclined teeth, and from the top of this incline the elevating chains take the crop and carry it to the top of the trough, where it is discharged and falls into the cart or wagon which immediately follows the apparatus." With this information before him, would he not make a frame-work which would put the teeth and elevator into position to produce the stated operation or result, if he was a skilled mechanic?

Ans. If he were a skilled mechanic only and not an inventor, it

is my opinion not only that he would not, but that he could not, consistently with the fixed conditions elsewhere set — in the patent.

X Int. 63. It is your deliberate opinion, is it, that the location and position of the teeth and elevator and the positions of the wheels all given, that no skilled mechanic could make a frame-work that would maintain those positions?

Ans. It is my opinion that he could, and that that would be the fatal thing about the machine. I don't believe that a machine having the points of the teeth and the lower points of the two sets of wheels all resting in the same horizontal plane or upon the land will be a practically operating machine for gathering hay or for the steerage of the machine by the intermediate wheels.

X Int. 64. The points of the teeth in all horse-rakes rest upon the ground, do they not?

Ans. So far as I know, they do.

X Int. 65. Does not the Townsend patent aid you in understanding that one of Perkins' suggested modifications, where he says:

"For the caster wheels may be travelling wheels"?

267 Ans. It does not clearly. The Townsend patent shows the driving wheel under the front end of the trough and the driving wheel under its middle or rear end. It is by no means clear to my mind that that is what is meant by the statement of the Perkins' patent. Possibly, however, it is.

X Int. 66. In Perkins' device the apparatus would rock in the hubs of the carrying wheels, so that the teeth would go up or down, according to the movement or relative position of the caster wheel, would it not?

Ans. They would not if, as the patent states, the points of the teeth rest on the land. In that case the caster wheel could not sink into a depression beneath it, because the teeth would support the front end of the trough. If by any means the teeth could get over or plow through an elevation, so that the caster wheel could ride upon it, then the front ends of the teeth would be lifted and the whole apparatus, including the caster wheel, would rock on the axle of the carrying wheels.

X Int. 67. Do you not understand that one way of managing or guiding the Perkins rake is by the horses, and that the statement that "provision may be made for steering the machine independent of the horses by a lever or other steerage appliance" is a second or a different way of doing it, if desired?

Ans. Perhaps that is the meaning of the specification.

By consent of counsel the further taking of testimony is adjourned until Saturday, October 2nd, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

268 SATURDAY, *October 2nd*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

X Int. 68. When the word "pole" is used in connection with a

vehicle or other apparatus to be drawn by horses, is it not invariably used in the sense of a draft pole or tongue?

Ans. That is undoubtedly the common use of the word in such connection, but it does not invariably indicate the forwardly projecting long poles on opposite sides of which horses are to be hitched. I have in my hand some patents relating to this art in which the word "pole" is applied to short draft bars by which one vehicle is to be attached to another, and to which, as shown, horses could not be harnessed in such a way as to guide the vehicle by such pole.

X Int. 69. When you are to determine the character of an instrumentality by its name do you ordinarily resort to obscure patent specifications or to the text books to ascertain the character of the device called for by the name?

Ans. I have looked at the patents mentioned to find that the word "poles" is not invariably used to designate forwardly projecting shafts reaching to the front of the horses and enabling them to guide the vehicle. I would ordinarily go to a text book rather than to a patent if I were in doubt.

X Int. 70. In making your answer to question 68, to what patents did you refer?

Ans. I then had in my hand the following patents: Patent to Willard, No. 69881, which shows a short draw bar, D, having
269 a hook in its end for connection with the rear of a cart or wagon. This draw bar is called a pole in the patent, and is apparently not more than, say, about four feet long. Foust patent No. 58804, which has a braced draft bar, marked B, projecting a short distance in front of the machine frame, and not long enough for the attachment of horses in such manner as to enable the horses to guide the machine by such draft bar, called a draft pole in the patent. I understand that this short draft bar or draft pole B is to be attached to the rear of a wagon behind which this hay-loader is to be drawn. The H. S. Palmer patent, No. 58282, shows a draw bar, T, of which the patent says: "T is a tongue or pole, by which my improved device is secured or attached to a wagon or cart and by which it is guided," and the drawing shows it extending forward only the distance of the elevator which is to deliver the hay into the rear end of the wagon or cart. In either of these patents, if horses were hitched where the wagon or cart is proposed to be hitched it would be at the front ends of these draw bars or poles, and said poles would not be effective in guiding the cart after the manner of ordinary wagon poles.

X Int. 71. In these patents or any others have you found a laterally projecting bar, to which thills or whiffletrees could be attached, called a pole?

Ans. I have not. I have made no extended search on this point.

X Int. 72. Perkins says: "The apparatus may be drawn by horses, one on either side of the fore end of the trough." When the horses are so located, leaving out of view the means for harnessing them to the apparatus, would not the rake teeth be between the horses?

Ans. Not necessarily.

270 X Int. 73. Why not?

Ans. It might be in advance of them, within the terms of that statement.

X Int. 74. The rake teeth are in advance of the fore end of the trough, are they not, and if the horses are harnessed to the fore end of the trough, how could it be possible that the teeth would not be in the space between the horses, the horses being hitched "one on either side of the fore end of the trough?"

Ans. The question would seem to indicate that the counsel does not understand the position of the horses as I understand it or as defendants' drawing represents it. I incline to the belief that Perkins meant the horses to be located at or alongside of the fore end of the trough, somewhat as shown in defendants' drawing. The question indicated that the horses may be hitched to the front end of the trough, which would bring them further forward and alongsidge of the rake. I admit that the whole matter is very doubtful, and that I don't know for certain from this patent just where the horses are located, but still believe the intention to have been to place them alongside the front end of the trough, in which case the teeth would be in advance of them.

X Int. 75. Perkins suggests the following modification, to wit: "Or it may be worked by horses harnessed quite in front of the machine, but so far separated from each other as to allow of their walking one on either side of the windrow of hay or corn, which lies between them, without trampling upon it." Even with this modification, does he not reserve the space between the horses for the rake?

271 Ans. He provides a space which may be said to equal the length of the rake, but in this case the rake is certainly not between them, but in their rear. Strictly, however, it is the width of the windrow which determines the width between the horses and not the rake, and the rake may actually be partly in line behind the horses. The words "quite in front of the rake" may mean either wholly in advance or actually in front of the rake, I think.

X Int. 76. Perkins' apparatus is for gathering hay instead of for straddling windrows, is it not?

Ans. The last part of the quotation given in the preceding question would seem to indicate the contrary. I understand that Perkins' machine is for raking hay already gathered into the windrows and by travelling lengthwise of the windrows, which are intended to be carried up by the elevator and deposited in the cart behind.

X Int. 77. Is not the handling of a team composed of two horses by a single driver the rule and not the exception?

Ans. It is and was, except as to this class of long stacker rakes, where the rule was the other way, without exception, prior to Kenaga's invention.

X Int. 78. How wide or about how wide would you make the raking part of the Perkins machine if you was attempting to make one wide enough to take up a windrow endwise?

Ans. Six or seven feet, I should say.

X Int. 79. With that width, separate riders for the horses would not be necessary, would they?

Ans. Possibly and probably not, if the horses were in front of the rake. In other words, the distance alone, I should think, of itself calls necessarily for separate riders. If the horses were placed
272 on opposite sides of the trough, however, it is not apparent to me how they could be managed without separate riders.

X Int. 80. Do not machines like the Perkins and the Townsend ordinarily have the capacity for being backed and some kind of an arrangement for that purpose?

Ans. I cannot say. The Townsend patent has a tongue, C, to which the horses will be harnessed, primarily, I should say, for guiding the vehicle in its forward movement, but to which, of course, backing strain can be applied. Two vehicles hitched up like the elevator structure and the wagon behind it are not, however, a device that can be conveniently backed, or, I should say, that is intended to be ordinarily backed.

By consent of counsel the further taking of testimony is adjourned until Monday, October 4th, A. D. 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

MONDAY, *October 4th, A. D.* 1886,
Ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

X Int. 81. Referring now to the Carrothers patent, do you not find the location of the horses as shown at Fig. 2 to be at the sides of the gathering prongs of that machine?

Ans. I should think the bodies of the horses, if drawn in proper place in the thills, would extend back about one-third of the length of the cutters P P from the line of their extreme points, or, say, a quarter of an inch on the drawing. How far, if at all, the cutters P P would project between the bodies of the horses in the
273 actual machine cannot be determined from the drawing, because the latter is clearly out of proper proportion.

X Int. 82. The hitch shown in the Carrothers patent is what would be called a side hitch rather than a front or rear hitch, is it not?

Ans. No; I should not so speak of it. The horses are in front of the machine, the same as horses are generally in front of a wagon. They are separated by no greater space also than is frequently seen in the case of team wagons, being at the same distance apart as the wheels, exactly in front of which they travel, and this distance in a corn-harvester will not exceed four feet as to the horses, because that is a maximum distance, as I understand it, between corn rows. I mean, of course, the tracks of the horses are, at most, only four feet apart, their bodies being less.

X Int. 83. You would take it, would you not, that this Carrothers machine was managed by a single driver?

Ans. I would.

X Int. 84. You have spoken of the knives P P as being vibrating cutters. This is a corn-ear stripping machine in which the cutters do not vibrate except vertically, is it not?

Ans. Their vibration is in a vertical direction.

X Int. 85. In harvesting corn from the stalk after it is grown and the ears ripe the stalks are frequently inclined or knocked over by storms, so that a wider space would be required in a harvester than would be required in a cultivator, would it not?

Ans. I can't say as to that positively—as to that at this moment. I understand that the horses travel on opposite sides of the
274 row of standing corn to be harvested, and that their tracks are from three and a half to four feet apart. To make them wider, so as to crowd the outer row or rows materially, would, I should think, further incline, or tend to further incline, such rows and render them unfit for harvesting by the machine.

X Int. 86. You would understand, would you not, that this Carrothers machine could be backed?

Ans. I would.

X Int. 87. In this machine and in other corn-harvesters shown in defendants' exhibits, taking the average height of grown corn, would you not consider cross reins much more in the way than they would be in gathering mown hay?

Ans. That would depend upon the kind of machine for gathering mown hay, possibly. In those hay-rakes in which the horses are hitched to an ordinary pole and travel in front of the rake there would be no trouble whatever from the use of crossed reins.

X Int. 88. As corn grown in what is known as the corn belt grows from ten to fifteen feet in height, in gathering corn ears from stalks of this height would not the use of cross-reins be practically impossible?

Ans. It would be necessary, I should say, to split the reins so far back that the corn would not strike them unless it had been previously topped.

X Int. 89. In the Carrothers machine all that is operated in gathering ears of corn are the knives P P and the elevator in front of the box, is it not, the office of the wagon box being simply to carry them along after their severance from the stalks?

Ans. That is the fact.

275 X Int. 90. Is there not in the Carrothers patent shown and described a gathering machine having the horses independently attached at the ends of the gatherer by projecting draft bars and thills attached thereto for hitching the horses forward of such bar or bars and so arranged that the machine can be backed?

Ans. The terms of the question apply as a very generic description to the machine shown in the Carrothers patent.

X Int. 91. For use with such a stacker as is shown in the Bean patent, would not the Kenaga poles be a disadvantage?

Ans. I see no reason why poles on the rake may not be advan-

tangeously used with the Bean stacker or loader. A central way would be added for the driver, probably.

X Int. 92. Would not a Kenaga rake, four or six feet wide, be an operative machine for gathering hay from a windrow?

Ans. Yes.

X Int. 93. Could not the Currier and Whitney machines be managed by a single driver?

Ans. I know of no reason why they could not. As to the Currier patent, it is said to be intended for cutting cotton stubble, though entitled corn-harvester. The Whitney patent, as indicated by the drawing, is intended to cut full-height stalks. Precisely how the team is managed in these machines I do not know; whether by a single driver or by a rider on one of the horses, who will be in reach of the bridle of the other horse. I understand there was never a successful corn-harvester made and their use is so uncommon, being practically limited to mere experiments, that I have never seen one in operation, though I have drawn the specifications for several of such machines.

276 X Int. 94. Referring now to the Hudson patent and taking the scale for the intermediate teeth to be eight feet, what would be the entire length of Hudson's bars C and what would be the length in front of the uprights?

Ans. Measuring on the certified copy of the Patent Office drawing, I find that the teeth project in front of the axle nearly three inches. If the patent means that they are eight feet long in front of the axle, then they are on a scale of about three-eighths of an inch to the foot. The same scale applied to the lifting poles or bars C C would make them ten feet and a third long between extremes and six feet long in front of the uprights. Measured in front of the axle, they would be about five feet and eight inches long.

X Int. 95. Taking the same scale for the Kenaga patent, how far would the teeth of the Kenaga rake project in front of the rake head and how far would the poles project in front?

Ans. I will state, to begin with, that the drawing of the Kenaga rake is not made to a scale or in accurate proportion. There is nothing in the drawing of the patent that will correctly indicate either the length of the teeth or the length of the poles. This drawing was made from a small model and without measurements of that, the model being used simply as a guide to the eye.

X Int. 96. Assuming the teeth of the Kenaga rake to be eight feet in length, how far would they project in front of the rake head, and what would be the length of the poles in front of the rake head; or, if you prefer, you may take the statement of the Kenaga patent for your proportions, that the rakes are about twelve feet long.

277 Ans. The length of the teeth I understand to be their projection in front of the rake head or axle. Assuming them to project eight feet in front of the rake head or axle, they would be on a scale of a nine-thirty-seconds of an inch to the foot, and the poles, measured from the hook to the axle, would be about seven feet and a third—rough estimate.

X Int. 97. Taking the length of the Kenaga rake, the scale would

be two feet to the inch, would it not—measuring from wheel to wheel?

Ans. It would.

X Int. 98. If you applied draft bars like the draft bars B of the Kenaga machine to the Hudson rake, Hudson's poles would then be long enough for tongues or poles, would they not, to be used for backing purposes?

Ans. Draft bars could be set far enough behind the wheels of the Hudson rake to bring the horses' breasts back of the ends of the lifting poles or bars of the Hudson rake, and this condition of such supposed use would thereby be produced.

X Int. 99. Does not Hudson specifically provide for placing the front end of the pole in working position by a number of holes, "so that the arms can be adjusted, by means of a bolt passing through, at any desired height?"

Ans. He provides for a vertical adjustment of the poles in respect to their purpose as devices by which the riders on the horses may handle them in their attempts to lift the front ends of the rake teeth from the ground.

X Int. 100. As a matter of fact, does it not depend in the Hudson machine upon the points where the horses are hitched behind and the holes in which the adjusting pins are placed whether the Hudson poles or arms are too short or too high to be used for backing poles?

278 Ans. It does not. In a machine constructed with a view to the purposes of the Hudson patent with respect to the poles or arms C C the lowest adjustment of said poles to bring them in the reach of the rider would leave them too high to serve properly as backing poles, and the greatest length that would be given them for the same purpose would leave them too short in front of the axle for proper backing devices. The hitching of the horses farther backward would not remedy these defects, since it is obvious that the poles shortened down to nothing in front of the uprights would not serve as media for backing at all, but solely for tipping the rake, and the higher the point at which power is applied on the standards the greater would be the tendency to tip. It follows from this illustration that poles which are both short and high are correspondingly unfit to receive backing strain. In my judgment, they are totally unsuited for backing purposes if made suitable for the purpose assigned them in the patent.

X Int. 101. If you placed the Hudson arms in the lowest adjusting holes of the Hudson patent would not the front ends of the poles be lower than the tops of the wheels?

Ans. Yes; lower than the tops of the wheels shown in the patent and a little less than five feet from the surface of the ground.

X Int. 102. If you reduced the diameter of the Hudson wheels to two feet, that would carry the arms down half the reduction of the wheels, would it not, at the point immediately above them?

Ans. It would.

X. Int. 103. Hudson says: "Extending across these three uprights

there is a bar placed, which not only gives greater strength
279 to them but also prevents the hay from slipping back over the prongs." For this last purpose stated this bar should not be over twelve or fifteen inches above the rake head or axle, should it?

Ans. I should think it might be higher than that without failure of its purpose. Long hay does not require much confinement.

X Int. 104. Ordinarily these bars are located about ten inches above the rake head, are they not?

Ans. I don't know exactly.

X Int. 105. Then you do not know how high this bar ought to be to practically prevent hay from passing over behind, do you?

Ans. I don't know precisely how high it may allowably be, but I should think from fifteen to eighteen inches would serve. I should say that a greater space would be permissible over the rake head than between the rake teeth, because the axle itself is above the rake teeth and would serve as a stop quite effectively alone. By the scale of three-eighths of an inch to the foot the rake teeth are something less than a foot apart.

X Int. 106. Hudson shows the lower edge of this bar on a line with the tops of his wheels, does he not?

Ans. He does.

X Int. 107. Do you understand that the Hudson drawing is made any more specific in regard to proportions than the Kenaga is?

Ans. I don't suppose it is.

X Int. 108. Do you understand that the presence or absence of a hay-stacker has anything to do with the Kenaga improvement, or that the presence of a stacker is necessary to make the Kenaga improvement useful?

280 Ans. I understand that the Kenaga improvement is upon a class of rakes which are principally used in connection with hay-stackers, and that the two machines, when both considered together, are parts of the same apparatus, belonging to the modern art of hay-stacking. Nevertheless, the Kenaga invention strictly belongs to the rake itself. The Kenaga improvement has a value by reason of its use with a stacker, but it also has a value independently of the stacker, for the rake may obviously be employed alone, provided any farmer has such use for it.

X Int. 109. In your deposition you have frequently spoken of machines belonging to different classes. Is it your opinion or idea that classification has anything to do with the devices; and, if so, what?

Ans. It may have much to do with them, particularly when classification is based on differences of construction or in general character. Take the ordinary corn-harvester or straddle-row cultivator and this long rake for examples of two different classes of machines. While two poles placed a foot or two apart may have been used in corn-harvesters or straddle-row cultivators merely to separate the horses to the distance between rows and to allow the plants to pass back between the horses, I think they afforded no suggestion of the possibility of using poles of any kind on opposite ends of a

twelve-foot horse-rake, spreading the horses still wider than that, and of the possibility of managing the horses in that case by a single driver. The wide distinction between these two classes of machines and between the methods of their management, which simultaneously obtained and continued for so long a time, makes it clear to my mind that the practical application of poles to a horse-rake was not an obvious thing. It is further clear to my mind that
281 what the poles accomplish in the horse-rake that they do not accomplish in the corn-harvester makes them practically different devices in their new position.

X Int. 110. Given the proposition that a horse-rake or any vehicle was to be backed by breast straps or breeching of a horse's harness, what other devices than poles or shafts could be selected? And given the further proposition that there was to be a space between the horses, either free or occupied by machinery, what other devices than the old duplex poles or separated thills could be used for carrying out these given purposes?

Ans. Answering the first part of the question, the proposition would not be the same as to horse-rakes as to other vehicles. Every wagon-maker proposes to back a wagon, but only Kenaga proposed to back a horse-rake; but assuming the proposition to back a horse-rake, something more than the old poles or thills was clearly necessary to do the work. If poles were used they were to be applied or arranged in a new way, by which something more than the mere backing of the rake could be accomplished—that is, by which they could be made to keep the horses off the rake teeth and in guiding them, so that a single driver occupying a new position on these rakes would do all that separate riders had previously accomplished. The particular arrangement of the poles which Kenaga illustrated in his drawings was the upward and outward inclination of such poles. If thills were used the poles are to be retained as guiding devices to aid in directing the horses, for the reason that thills alone are unsuited for this purpose. The foregoing remarks answer also the second part of the question as applied to horse-rakes.

282 X Int. 111. The record defendants' patent exhibits show, do they not, that Kenaga did in fact select old duplex poles for accomplishing his backing purposes and suggested old duplex thills as the equivalent therefor?

Ans. In the sense that all poles are the same in being long sticks or bars, defendants' patent exhibits show the poles that Kenaga selected for his rake; but they do not show in a single instance such poles applied to anything in the same way, or wherein they accomplish all of the same results, or wherein they are employed in the same combination. As to thills, defendants' patents also do not show them in the same combination or relation with rake teeth in which Kenaga employs them, or with the adjunctive device of poles by which to aid in guiding the horses and in the use of which poles the thills become mere backing devices. As I have before stated, both in the *prima facie* and in this deposition, Kenaga's proposed thills are the equivalents of the stiff poles C C only with respect to their backing function. The further functions of his poles, as he

shows and describes them, to wit, the guarding and the guiding of the horses, are supplied by the poles which are used with the thills and to which the horses' heads are to be hitched. Kenaga, therefore, does not use merely the old poles and thills of the prior art in other vehicles and machines.

X Int. 112. You do not understand, do you, that Kenaga was the first to apply poles or thills to a horse-rake so as to require only a single driver?

Ans. To this class of rakes and for the horses at the ends of it, I do.

X Int. 113. Single poles and thills are common in a large class of wire tooth and sulky hay-rakes, are they not?

283 Ans. Yes; precisely in the same position and performing the same functions that they do in a wagon.

X Int. 114. If a person not understanding the best way of managing a Kenaga rake should use cross-reins he would not thereby change the character of the Kenaga improvement, would he?

Ans. No; inasmuch as it is what the improvement makes possible rather than what may be actually done with it that determines its distinctive character.

X Int. 115. In the rake suggested in the Kenaga patent as the one improved by him you could gather the hay in the field, bring the hay to a stacker, and get the rake from under the load and go back to the field for a new load, could you not?

Ans. Yes.

X Int. 116. Then is not what you have thought to be a new mode of operation in the Kenaga rake simply a different way of handling it to produce the old operations?

Ans. By the new mode of operation to which I have several times referred I have not meant a new mode of doing its work, but a new mode of managing the rake, including the management of the horses by a single driver in the direction in which the horses work in withdrawing the rake from beneath the load and in drawing it empty across the field.

Counsel for defendants offers in evidence the patent to B. M. Townsend for a hay-loader, dated April 9th, 1850, No. 7277, and requests the same to be marked "Defendants' Exhibit Townsend Patent," and it is so marked.

284 Redirect examination:

R. D. Int. 117. In X Int. 38 you were asked, "If a rake should be constructed with the Kenaga pole C directly over and in line with the outer rake teeth and the front irons *c* were made longer so that their outer ends or hooks would be in the position shown in the Kenaga patent would a rake so constructed, in your opinion, contain the Kenaga improvements, the other parts of the rake being constructed as shown in said patent?" I will now ask you to state what you understand to be the distance in lateral direction from the hooks *c* to the outside rake teeth of the patent, and state also how

far from the outer rake teeth and from the poles the horses would be hitched in the construction assumed by said X Int. 38.

Ans. That X Int. was directed to the drawing of the Kenaga patent, looking at which I judged the distance of the horses' tracks from the rake teeth to be about two feet or perhaps a little less. I now understand the distance at which the horses' tracks from the rake teeth to be from three feet to three feet and a half.

R. D. Int. 118. In the construction stated in the X Int. 38, and assuming that the ends of the hooks *c* are within two feet or less of the poles, and assuming the poles to be, as there stated, above and in line with the rake teeth, would the horses when hitched to the hooks be guarded by the poles from being struck by the rake teeth or be properly guided, as they are, by the poles of the Kenaga patent?

Objected to for the reason that there is nothing in the complainant's patent about guarding the horses.

285 Ans. I believe they would not be. I think such construction would be wholly impracticable for that reason. I may be wrong in this, not having seen the experiment tried, but, while not positive, give that as my confident judgment.

By consent of counsel the further taking of testimony is adjourned until Thursday, October 7th, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

THURSDAY, *October 7th*, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

R. D. Int. 119. If the poles were parallel to and above the rake teeth, as assumed in X Int. 38, and the hooks extended far enough outwardly to guide the horses and prevent them being struck by the teeth, would you or would you not regard this construction as within the Kenaga patent?

Ans. I would if also the construction referred to enabled the horses to back the rake. In that case every function of the poles C C of the Kenaga patent would be obtained in the supposed construction, and I would not regard the change in form a departure from the Kenaga invention.

The opinion expressed in the last part of my answer to X Int. 38, to the effect that the construction stated in that question would not contain the Kenaga invention, was distinctly based on the belief, also there expressed, "that the devices exactly as mentioned in the
286 question" would not "serve all the purposes of the Kenaga poles C C or be a practical device for this class of rakes." To make myself perfectly clear I add that parallel poles directly over the outer rake-teeth and having lateral arms at their front ends extending no farther outward than to the position of the hooks on the inclined poles of the Kenaga patent, and supposing said hooks on the inclined poles extend out no farther than will keep the horses

off the rake by the actual presence of such inclined poles, then the parallel poles with correspondingly longer arms will not keep the horses off the rake, and the device will therefore not be practical; but the supposition of the present question is that the lateral arms on the parallel poles are long enough to keep the horses off the rake when hitched to said arms by breast straps. This is a very different question, and I unhesitatingly answer that such a construction assumed by the very terms of the question to be a practical device and to perform all the functions of the Kenaga poles would fall within the claim of the Kenaga patent. In this case the breast strap guides the horse from both directions and without aid from the direct contact of the pole with the horse, while in the use of inclined poles, as shown in the Kenaga patent, the horses would be guided by the breast straps only in one direction. This difference I would not consider a material one, because the poles in both cases are the agencies for guiding the horses.

In X interrogatory 41, where the horses were supposed to be held by the breast strap at a distance of four feet from the rake teeth by poles of the parallel and laterally armed construction, I was not asked if that construction would fall within the Kenaga patent, but if I had been so asked I should have replied affirmatively,
287 because I believe that four feet is a sufficient distance of the horses from the rake to keep them clear of it by that form of pole.

In keeping with my answer to X Int. 42 I further explain that inclined poles will be better than the parallel and armed form to keep the horses off the rake when it is desired to limit the distance of the horses from the rake to the minimum, because the inclined pole, being actually present in the way of the horse, will manifestly serve better than the mere connection of the horse by the breast strap.

Counsel for defendants, as illustrating the runner-rake with which the Kenaga rake has been heretofore compared, offers in evidence patent No. 66679, to J. P. Hunter, for a horse-rake, dated July 16, 1867, and requests the same to be marked "Defendants' Exhibit Hunter Patent," and it is so marked.

Counsel for complainant objects to the introduction of the Hunter patent in evidence, as the same has never been set out in the answer, nor is it pretended to have any bearing upon the testimony given by this witness in redirect or otherwise.

MELVILLE E. DAYTON.

Subscribed and sworn to before me this 7th day of October, A. D. 1886.

[SEAL.] ALBERT H. ADAMS,
Notary Public.

288 STATE OF ILLINOIS, } ss:
County of Cook, }

I, Albert H. Adams, a notary public in and for the county of

Cook, in the State aforesaid, do hereby certify that the foregoing depositions of Jesse Hudson, John E. Kirk, and Melville E. Dayton were taken by and before me at the times and place therein specified, pursuant to agreement between the parties; that the parties to the said cause were present at the taking of the same—complainant by its counsel, Messrs. Peirce & Fisher, and defendants by their counsel, L. L. Bond, Esq., as therein appears; that before deposing the said Jesse Hudson, John E. Kirk, and Melville E. Dayton were each by me duly sworn to tell the truth, the whole truth, and nothing but the truth in the cause now pending in the circuit court of the United States for the northern district of Illinois wherein The Acme Hay Harvester Company is the complainant and Stephen Martin *et al.* are the defendants; that the depositions of the said Jesse Hudson, John E. Kirk, and Melvelle E. Dayton were reduced to writing by me from their respective statements and the same duly subscribed to by them, as therein appears.

And I do further certify that I am neither attorney nor of counsel for any of the parties in said depositions or caption named and am in nowise interested in the result of said cause.

In testimony whereof I have hereunto set my hand and affixed my notarial seal this seventh day of October, A. D. 1886.

[SEAL.] ALBERT H. ADAMS,
Notary Public.

290 UNITED STATES PATENT OFFICE.

MARTIN H. KENAGA, of Momence, Illinois.

Horse Hay-Rake.

Specification forming part of Letters Patent No. 259,550, dated June 13, 1882; application filed March 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, Martin H. Kenaga, of Momence, in the county of Kankakee and State of Illinois, have invented certain new and useful improvements in horse hay-rakes for stackers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to horse hay rakes or "sweeps" of the class employed in connection with stackers, and particularly to those rakes of this class which are drawn by horses hitched one at each end. Heretofore such rakes or sweeps (which are about twelve feet long) have been drawn out from beneath the load when delivered to the stacker by wheeling the horses about and drawing the rake backward. Thus managed, each horse requires a separate rider, who must be a boy not so large as to overburden the animal and yet old enough to manage the horse intelligently. The difficulty in obtaining boys of the proper age for this purpose during the haying season is found to be a practically fatal objection to this form of rake.

By my invention I seek to do away with the use of riders and to enable a single man or boy to manage both horses so attached, such person being mounted on the rake or walking behind it.

To this end my invention consists in providing means at each end of the rake whereby the horses there attached may back the rake out from under its load, instead of turning around and drawing it out.

In the drawing a rake of the class referred to is shown in top or plan view and provided with my improvements.

(Here follows diagram marked p. 289.)

A is the cross-head of the rake, having supporting-wheels at its opposite ends and duly trussed vertically to give requisite strength.

B B are projecting arms in the usual or any desired form, to the outer ends of which the horses are attached.

C C are stiff poles secured permanently or removably to the ends of the rake-head, and, as here arranged, directed forward, upward, and outward therefrom, so that the free front end of each is in position to allow the adjacent horse to be hitched thereto by a breast-strap.

D is a seat for the driver, supported from the rake-head and located at the rear of its axis. The horses being hitched to the projecting arms B B for draft and hitched forward to the poles C C for backing, the driver, from his position on the seat D or at a central point at the rear of the rake, may direct or back the horses with ease. By having the reins split back to a point in convenient reach he will be able to back one horse or otherwise manage him independently of the other. An iron hook, *c*, extended outward from the end of the pole C will give a hitching-point more directly in front of the horse.

If preferred, a pair of thills may be connected with each of the arms B B, in which the horse is hitched in the usual way, which construction would be the equivalent of that shown in the drawing. When thills are used, however, it will be advisable to employ the poles B, by which to hitch the horses' heads as an aid in guiding them, in which case said poles may be relatively light.

The aggregate weight of the rake-teeth E in this form of sweep is very considerable, and the driver's seat, it is found, may be located some distance at the rear of the axial support of the rake and be sustained therefrom, as shown, without the aid of any third wheel or other bearing on the ground. When the rake is loaded the weight of the driver so seated is a positive and appreciable advantage, since the load bears heavily on the front end of the rake-teeth, which slide on the ground. Carrying the driver in the position indicated on the machine described therefore positively lightens the draft on the team.

I claim as my invention—

In a horse-rake having the horses independently attached at the ends of the rake, the projecting draft-bars B B, in combination with the projecting poles C C, for hitching the horses forward, whereby

Complainant's Exhibit Kenaga Patent

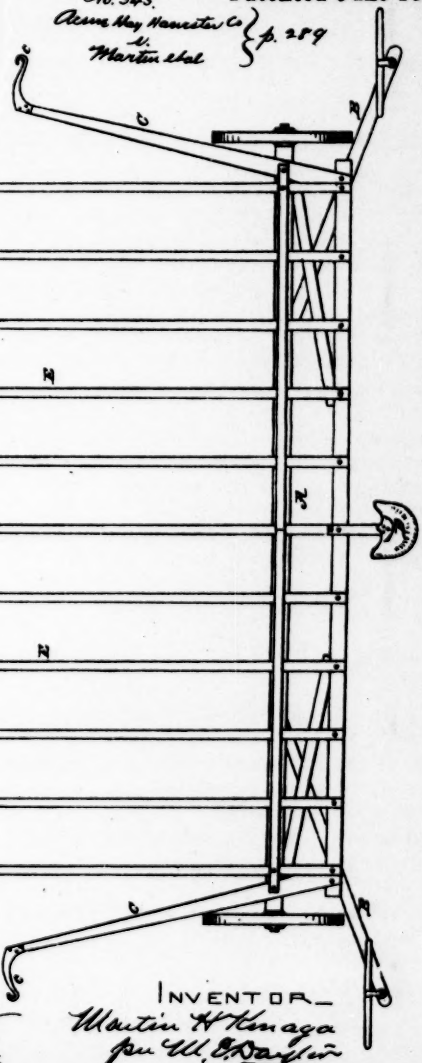
(No Model.)

M. H. KENAGA.

HORSE HAY RAKE.

No. 259,550. Patented June 13, 1882.

No. 345.
Acme Hay Harvester Co
vs.
Martin et al
p. 259



WITNESSES—
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Cyrus Kehr.

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Martin H. Kenaga
per W. E. Davison
Attorney

they may back the rake from beneath its load, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

MARTIN H. KENAGA.

Witnesses:
M. E. DAYTON.
W. C. ADAMS.

291 COMPLAINANT'S EXHIBIT "A." H. M. Munday, N. P.

Whereas I, Martin H. Kenaga, of Momence, in the State of Illinois, did invent certain new and useful improvements in hay-rakes, for which were granted to me letters patent of the United States No. 259,550, dated June 13th, 1882; and whereas William F. Kenaga, of Kankakee, in the county of Kankakee, in the State of Illinois, desires to acquire the sole and entire right, title, and interest in and to said invention and letters patent: Now, therefore, to all whom it may concern, be it known that for and in consideration of the sum of one dollar ($1.00) and of other valuable consideration to me in hand paid by the said William F. Kenaga, the receipt of which is hereby acknowledged, I, the said Martin H. Kenaga, have sold, assigned, and set over, and by these presents do sell, assign, and set over, unto the said William F. Kenaga, his heirs and legal representatives, all my right, title, and interest in and to the said invention and in and to the said letters patent.

In witness whereof I have hereunto set my hand and affixed my seal, at Kankakee city, this 18th day of December, 1884.

MARTIN H. KENAGA. [SEAL.]

Endorsed: Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

292 COMPLAINANT'S EXHIBIT "B." H. M. Munday, N. P.

Know all men by these presents that whereas Martin H. Kenaga, of Momence, in the State of Illinois, did invent certain new and useful improvements in hay-rakes, for which were granted to him letters patent of the United States No. 259,550, dated June 13th, 1882; and whereas, on the 18th day of December, 1884, the said Martin H. Kenaga did, by assignment of that date, sell, assign, transfer, and convey unto William F. Kenaga, of Kankakee city, Illinois, all the right, title, and interest in and to said invention and in and to said letters patent;

And whereas said William F. Kenaga has assigned his entire interest in and to said letters patent to Acme Hay Harvester Company of Peoria, Ill.:

Now, therefore, in consideration of one dollar and other good and valuable considerations to us in hand paid, the receipt whereof is hereby acknowledged, the said Martin H. Kenaga and William F. Kenaga, of Kankakee, do hereby sell, assign, convey, and set over

all rights in action accrued by reason of infringement of said letters patent which we may have against any persons whomsoever and all damages occasioned by reason of infringements of letters
293 patent No. 259,550 to the said Acme Hay Harvester Company, hereby authorizing and empowering the said Acme Hay Harvester Company to bring suit in their own name for all damages or profits arising from such infringement.

In witness whereof we have hereunto set our hands and affixed our names this the twenty-eight- (28th) day of January, A. D. 1885.

WILLIAM F. KENAGA. [SEAL.]
MARTIN H. KENAGA. [SEAL.]

Witness:
E. H. VAIL.
JOHN B. LOCKEY.

Endorsed: Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

294 COMPLAINANT'S EXHIBIT "C." H. M. Munday, N. P.

Know all men by these presents that whereas Martin H. Kenaga, of Momence, in the State of Illinois, did invent certain new and useful improvements in hay-rakes, for which were granted to him letters patent of the United States No. 259,550, dated June 13th, 1882; and whereas, on the 18th day of December, 1884, the said Martin H. Kenaga did, by assignment of that date, sell, assign, transfer, and convey unto William F. Kenaga, of Kankakee city, Illinois, all the right, title, and interest in and to said invention and in and to said letters patent:

Now, therefore, to all whom it may concern, be it known that I, William F. Kenaga, of Kankakee city, Illinois, for and in consideration of the sum of twenty-five (2,500) hundred dollars and other valuable considerations to me in hand paid by Acme Hay Harvester Company of Peoria, Illinois, receipt whereof is hereby acknowledged, I, the said William F. Kenaga, have sold, assigned, and set over, and by these presents do sell, assign, and set over, unto said Acme Hay Harvester Company (a corporation existing under and by virtue of the laws of the State of Illinois), their suc-
295 cessors or assigns, all the right, title, and interest in and to said invention and in and to said letters patent, hereby granting unto said Acme Hay Harvester Company all the right, title, and interest which I may have acquired in said invention and letters patent under and by virtue of the aforementioned assignment from the said Martin H. Kenaga.

In witness whereof I have hereunto set my hand and affixed my seal, at Kankakee city, State of Illinois, this the twenty-eighth (28th) day of January, A. D. 1885.

WILLIAM F. KENAGA. [SEAL.]

Witness:
E. H. VAIL, *of Kankakee, Ill.*
JOHN B. LOCKLEY, *of Kankakee, Ill.*

Endorsed: Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

JESSE HUDSON'S

95-40

HAY RAKE.

№ 94889

PATENTED
SEP 14 1869

Fig. 1

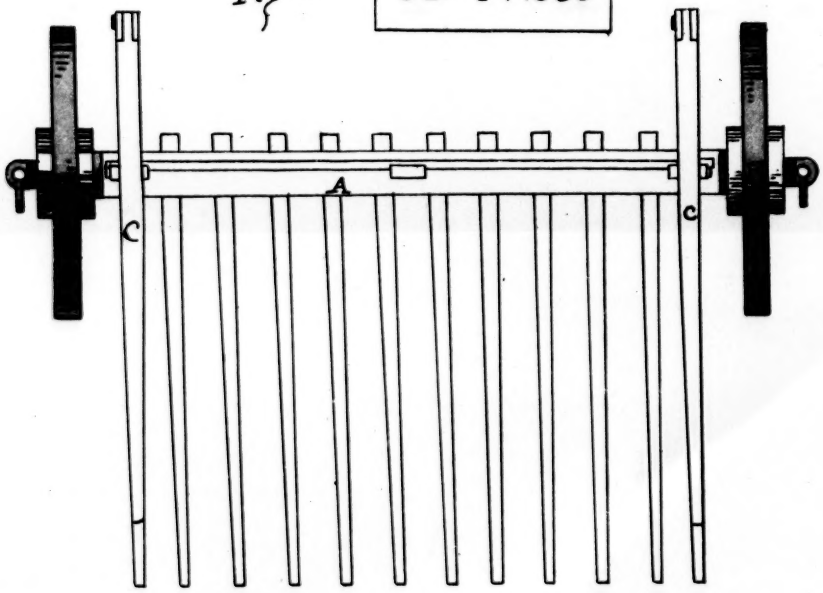
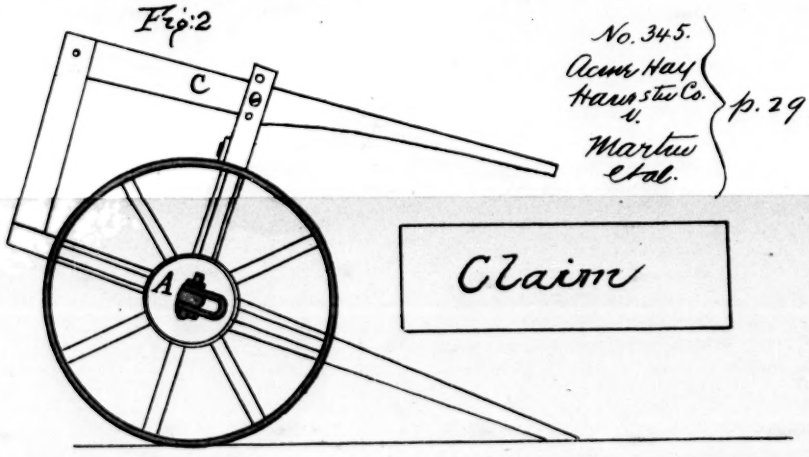


Fig. 2



No. 345.
Acme Hay Harvester Co. v. Martin et al.
p. 297

Claim

Witnesses
J. A. Hurdle
Gerald Evers

Inventor
Jesse Hudson
per Alexander Mason
Attys

297

296 COMPLAINANT'S EXHIBIT HUDSON ORIGINAL DRAWING.
A. H. A., N. P.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the drawing in the matter of the letters patent granted Jesse Hudson September 14, 1869, No. 94889, for improvement in hay-rake.

In testimony whereof I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be affixed
[SEAL.] this 11th day of August, in the year of our Lord one thousand eight hundred and eighty-six, and of the Independence of the United States the one hundred and eleventh.

M. V. MONTGOMERY,
Commissioner.

(Endorsed:) Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

(Here follows diagram marked p. 297.)

298 Circuit Court of the United States, Northern District of Illinois.

THE ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et als.*
} In Equity.

At Chicago, Illinois, on this the nineteenth day of May, A. D. 1886, before Albert H. Adams, notary public.

Present: Peirce & Fisher, for complainant; L. L. Bond, Esq., for defendants.

At two o'clock in the afternoon, pursuant to agreement, the parties to the said cause, by their counsel, as above, met at the office of Messrs. West & Bond, rooms 50 to 54, No. 204 Dearborn street, Chicago, Illinois, where the following proceedings were had:

Counsel for defendants offers in evidence a certified copy of letters patent of the United States No. —, dated February 27, 1827, granted to Moses Pennock and Samuel Pennock for improvement in hay and grain horse-rake, and the same is marked "Defendants' Exhibit Pennock Patent."

299 Also copies of the specifications and drawings of the following letters patent of the United States:

Letters patent No. 5587, dated May 16, 1848, to W. W. Baldwin and A. S. Lyman for improvement in horse-rakes, and the same is marked "Defendants' Exhibit Baldwin and Lyman Patent."

Letters patent No. 14409, dated March 11, 1856, to B. T. Roney for improvement in grain and grass harvesters, and the same is marked "Defendants' Exhibit Roney Patent."

Letters patent No. 27352, dated March 6, 1860, to B. T. Currier for improvement in machines for cutting up cotton plants, and the same is marked " Defendants' Exhibit Currier Patent."

Letters patent No. 47211, dated April 11, 1865, to Lewis W. Mason for improvement in carriages, and the same is marked " Defendants' Exhibit Mason Patent."

Letters patent No. 55672, dated June 19, 1866, to Jacob King for improvement in horse-rakes, and the same is marked " Defendants' Exhibit King Patent."

Letters patent No. 79284, dated June 23, 1868, to Frank Wicks for improvement in horse-rakes, and the same is marked " Defendants' Exhibit Wicks Patent."

Letters patent No. 89160, dated April 20, 1869, to G. W. Middlecoff, assignor, etc., for improvement in horse-rakes, and the same is marked " Defendants' Exhibit Middlecoff Patent."

Letters patent No. 94889, dated September 14, 1869, to Jesse Hudson for improvement in horse-rakes, and the same is marked " Defendants' Exhibit Hudson Patent."

Letters patent No. 103,362, dated May 24, 1870, to Samuel
300 Patton, assignor, etc., for improvement in combined corn harvester and husker, and the same is marked " Defendants' Exhibit Patton Patent."

Letters patent No. 120,688, dated November 7, 1871, to John H. Whitney, assignor, etc., for improvement in corn-harvesters, and the same is marked " Defendants' Exhibit Whitney Patent."

Letters patent No. 134,251, dated December 24, 1872, to James Carrothers and Williamson Carrothers for improvement in corn-harvesters, and the same is marked " Defendants' Exhibit Carrothers Patent."

Letters patent No. 140,671, dated July 8, 1873, to Jacob H. Bean for improvement in horse hay-rakes, and the same is marked " Defendants' Exhibit Bean Patent."

Letters patent No. 152,174, dated June 16, 1874, to John Rumrill for improvement in horse hay-rakes, and the same is marked " Defendants' Exhibit Rumrill Patent."

Letters patent No. 66186, dated June 25, 1867, to John F. Swinnerton for improvement in horse-rakes, and the same is marked " Defendants' Exhibit Swinnerton Patent."

Letters patent reissue No. 1511, dated July 14, 1863, to F. F. Fowler for improvement in machines for gathering hay, and the same is marked " Defendants' Exhibit Fowler Patent."

Letters patent No. 75450, dated March 10, 1868, to W. T. Nichols for improvement in hay rakes and loaders, and the same is marked " Defendants' Exhibit Nichols Patent."

Letters patent No. 288,314, dated November 13, 1883, to
301 Joseph Dain, Jr., for improvement in horse hay-rakes, and the same is marked " Defendants' Exhibit J. Dain Patent."

Counsel for the complainant objects to the introduction of all the foregoing exhibits except the following, to wit, Exhibit King Patent, Exhibit Hudson Patent, and Exhibit Rumrill Patent, because the same have not been set out in the answer, and the counsel had

no notice thereof, or that the same would be relied upon until now produced.

WILLIAM S. BATES, a witness produced on the part of the defendants, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by L. L. BOND, Esq., as follows:

Int. 1. State your name, age, residence, and occupation.

A. William S. Bates; age, 34 years; residence, Chicago, Illinois; occupation, civil and mechanical engineer.

Int. 2. What opportunities have you had for becoming familiar with patents, patented improvements, and machinery generally, and what opportunity have you had for becoming familiar with horse-rakes and other machinery for harvesting hay? And state whether or not you have been heretofore called to testify as an expert in patent causes.

A. My profession brings me in daily contact with mechanical devices and machinery of various kinds. For several years I was engaged as a solicitor of patents and became familiar with patents and patented improvements in general. During the last eight or nine years I have been frequently called upon to testify as an expert in patent cases. I have had occasion at different times to
302 examine the United States patents for horse-rakes and other hay-harvesting machinery, and have testified in two or three patent cases involving such machines. I have also constructed horse-rakes in the shops and have operated them in the field.

Int. 3. Have you examined the specification and drawing of the Complainant's Kenaga Patent No. 259,550, dated June 13, 1882, and do you understand the same?

A. I have examined it and believe I understand the same.

Int. 4. What alleged invention or improvement do you find set forth and described and claimed in the complainant's Kenaga patent?

A. The invention is stated in the patent to relate to horse hay-rakes of the class in which the horses are hitched, one at each side of the machine, to projecting draft bars. To overcome certain objections which he sets forth the patentee adds to the rakes of the class named a couple of stiff poles, one at each side of the machine, which poles project outward toward the heads of the horses so that the horses may be attached to them to back the machine when desired. It is the combination of these stiff poles with the draft bars which I understand to be the improvement specified in the claim of the patent. The patentee states in his specification that instead of the poles thills may be used, the thills being the equivalent of the poles. As I understand the specification, there is nothing peculiar about these thills or poles except their application to this particular machine. They are the ordinary devices to which the horses are hitched forward for backing the wagon or other machine to which they are hitched and for guiding the animals.

303 Int. 5. Have you examined the several patent specifications and drawings exhibited in this cause by the defendants, to wit, Pennock patent, Lyman and Baldwin patent, Roney patent,

Currier patent, Mason patent, King patent, Wicks patent, Middlecoff patent, Hudson patent, Patton patent, Whitney patent, Carrothers patent, Bean patent, Rumrill patent, Swinnerton patent, Nichols patent, and Fowler patent, and do you understand the construction and operation of the several devices shown and described in said patents?

A. I have examined said patents and believe I understand the devices shown and described in them.

Int. 6. State what devices you find shown and described in the several patents mentioned in the preceding question having particular reference to such parts or combinations of parts as may have a bearing upon the alleged improvement described and claimed in the complainant's Kenaga patent.

A. The Pennock patent of 1827 shows and describes a horse-rake of substantially the form set forth in the complainant's patent. If a pair of ordinary thills were attached at each side of the Pennock patent that patent would have exactly the complainant's structure. The Pennock patent shows two poles projecting forward, one at each side of the rake, which, if made a little longer, could be used to hitch the horses to, so that the machine could be backed when desired just as the complainant's machine is. Any ordinary mechanic could attach the thills to this machine or lengthen out the poles without the exercise of invention.

The Lyman and Baldwin patent of 1848 shows and describes a rake like that of the complainant's patent, except that the horses are behind the teeth instead of at the side of them. In this patent
304 there is a pole which extends forward and has the horses hitched to it, so that they can back the machine in the usual way. This Lyman and Baldwin machine could be used to gather hay and deliver it to the stacker, and when delivered the rake could be backed out from the load exactly as stated in the complainant's patent.

The Roney patent represents a mowing-machine to which the horses are hitched one at each side. The sides of the machine extending forward are in effect tongues, to which the horses can be hitched forward, so as to back the machine when desired. This Roney machine has projecting arms or draft bars, and it has the projecting poles composed of the sides of the machine, and therefore it has the complainant's combination. All that is necessary in the Roney machine is to change the points or teeth of the finger bar into rake teeth, and we will have a rake of the same class as complainant's, containing complainant's combination and operating in the same manner.

The Currier patent shows and describes a corn-harvester in which the horses are hitched, one at each side, to projecting draft bars, and in which there are two stiff poles, one on each side of the machine, which poles project forward, upward, and outward, so that the free front end of each is in position to allow the adjacent horse to be hitched thereto. This is exactly the complainant's combination applied to a corn-harvester instead of to a hay harvester or rake. Any mechanic could without invention have taken this combination

from the Currier patent and applied it to one of the existing rakes at the date of the Kenaga invention.

The Mason patent of 1865 shows and describes two sets of thills so arranged that two horses may be hitched in them side by
305 side. These thills might be applied to the Pennock or some other of the well-known rakes which existed at the time of the Kenaga invention, and this could be done by any mechanic without invention, and when done it would constitute the machine of the complainant's patent in the modified form suggested in the specification.

The King patent of 1866 shows and describes a horse-rake in which the horses are hitched one at each side of the machine. If the thills of the Mason patent or the poles of the Currier patent were applied to this machine, as they could be by any mechanic without invention, we would have the complainant's patent machine.

The Wicks patent shows and describes a horse-rake having a pole to which the horses are hitched. This machine can be used to gather a rake full of hay to deliver to the stacker, and the machine can then be backed out from under its load, just as the complainant's machine is.

The Middlecoff patent of 1869 shows and describes a horse-rake for gathering hay and delivering it to the stack. The horses are hitched one at each side of this machine, and it is only necessary to apply to it the thills of the Mason patent or the poles or draft arrangement of the Currier patent to convert it into the machine described and claimed in the complainant's patent. Any mechanic could make this application without invention, and it is the first thing he would think of if he wanted to back his rake out from under its load or to arrange it so that the horses could be managed by a single man or boy.

By agreement the further taking of testimony is adjourned until Thursday, May 20, 1886, at ten o'clock in the forenoon.

ALBERT H. ADAMS,
Notary Public.

306 THURSDAY, *May* 20, 1886—ten o'clock in the forenoon.

Met pursuant to adjournment.

Present as before.

Witness resumes answer to Int. 6, and continues as follows:

The Hudson patent of 1869 shows and describes a horse-rake of the same class as the complainant's. In this patent the draft bars, to which the horses are hitched, are formed by extensions of the axle outside of the wheels. At each side of the rake there is also a pole which extends forward near the horses' heads. The horses could be hitched to the forward ends of these poles and then could back the machine, and one man could manage both horses. With the horses hitched to the front ends of these poles the Hudson machine would contain the combination of the complainant's patent. Any ordinary farmer's boy would hitch the horses in this way without invention, and I have no doubt it has frequently been done.

The Patton patent of 1870 shows and describes a corn-harvester having a pair of thills at each side of the machine. If the operative parts of the machine were rake teeth for harvesting hay, instead of a mechanism for harvesting corn, this Patton machine would be exactly the complainant's patent machine in the modified form suggested by this specification. Any mechanic could make this change in the Patton machine without invention, and any mechanic could take Patton's thills and apply them to the Hudson or the Pennock or some of the other old rakes and thus produce the machine of complainant's patent without invention.

The Whitney patent of 1871 shows and describes a corn-harvester in which the horses are hitched, one at each side of the machine, to suitable draft bars. At each side of the machine there is
307 a pole extending forward and outward, to which the front end of the horse is hitched. This enables the horses to back the machine and enables one man to manage both horses. Any mechanic could substitute haying mechanism for the corn-harvesting mechanism and thus produce the machine of complainant's patent without invention.

The Carrothers patent of 1872 shows and describes a corn-harvester having a pair of thills at each side of the machine and a series of teeth in the space between them. These teeth could be arranged to gather hay and deliver it to the stacker, and the machine would then be exactly the machine of complainant's patent.

The Bean patent of 1873 shows and describes a horse-rake of the class set forth in complainant's patent. Any mechanic could, without invention, apply to this Bean machine the separate poles of the Currier or the Whitney patents or the separate thills of the Mason, the Patton, or the Carrothers patents, thus producing exactly the machine of the complainant's patent. He could do this without invention, because neither the poles or thills nor the rake have to be changed at all to adapt them to each other, and because the functions and operation of these parts is exactly the same in their new position that they were before.

The Rumrill patent of 1874 shows and describes a similar machine to that of the Bean patent, and the same remarks apply to it as to the Bean.

The Swinnerton patent of 1867, the Nichols patent of 1868, and the Fowler reissue patent of 1863 all show horse-rakes provided with a single pole each, which enables the team to back the machine as desired, and which enables one person to guide the horses. If it were desired to hitch the horses at opposite sides of the ma-
308 chine instead of having them both together at the middle it could easily be done by applying the Currier or other separate poles in the manner that they are used in the Currier machine, and it would require no invention to do this.

Int. 7. Have you examined and do you understand the construction and operation of the model "Complainant's Exhibit Defendants' Rake"?

A. I have examined and believe I understand it.

Int. 8. Please compare the rake shown in said model with the ma-

chine shown and described in complainant's Kenaga patent and state wherein, if at all, the defendants' rake differs in construction or operation from the patented one, and state whether or not, in your opinion, the rake shown in said model embodies, in substance or in form, the improvement claimed in and by complainant's said patent, and give your reasons for any opinion you may express.

A. The defendants' rake is one of the well-known kind referred to in complainant's specification as having been in use before for the purpose of gathering hay and delivering it to the stacker. To this well-known rake the defendant has added a device for hitching the front end of the horse to. This device consists of a pole loosely hinged by a snipe-bill joint to the upper beam of the rake and connected by a brace bar with the draft bar of the machine. This arrangement permits the machine to be backed without raising the teeth off of the ground and permits the teeth to be raised off of the ground without chucking the horse under the chin. This construction differs from the complainant's in the following particulars:

In the complainant's patent the machine has at each side a stiff pole to hitch the horses to in front. These poles
309 are rigidly secured to the rake head. The result of this construction is that when the team is backed the teeth of the rake are raised off the ground, and the tendency is to carry the load back with the rake instead of backing the rake from under it, and when it is desired to raise the rake teeth off the ground in going from the stack to the field the poles will be raised up under the horses' chins, and their weight will oppose the raising of the teeth, and in any case it will be impossible to raise the teeth more than a very little off the ground. As a consequence, it would be impossible to do the same amount of work in a day with the rake of complainant's patent that could be done with the old-style rakes, on which it is supposed to be an improvement. With the old-style rakes when the load is brought to the stacker the horses can be swung around, drawing the rake away from the load and taking it back to the field on a trot, whilst with the complainant's patent rake the rake must first be backed away from the load. The load must sometimes be held while the rake is backing away from it. The rake must then be turned around, and, owing to the impossibility of raising the teeth any distance from the ground, must proceed slowly back to the field.

The defendants' rake, owing to the differences in construction between it and the complainant's, can be worked more rapidly.

There being no lifting tendency on the teeth when backing, they will draw out from under the load with certainty, and there will be a gain in speed on this account. As there is no stiff tongue to be raised up when the teeth are lifted from the ground, the teeth can be raised well up, so that the rake can be turned more rapidly and can be taken back to the field on a trot, and there will be a gain in
310 speed over the complainant's in this respect. As rapidity of work is an important element in hay-harvesting, the machine of the complainant's patent must be considered a step backward in the art. The defendants' machine, on the contrary, being equally

rapid with the older machines and more convenient to use, is a step forward.

If the complainant's patent be construed to cover any combination of two poles and two draft bars in a horse-rake, then, of course, it would cover defendants' construction, but if it be limited to stiff poles or to the particular poles which it shows and describes, then it clearly does not include the defendants' machine.

Cross-examination by J. H. PIERCE:

C. Int. 9. When and where and what kind of horse hay-rakes have you constructed?

A. They were wire-tooth rakes. I have made them in different places; the first about six years ago.

C. Int. 10. What do you mean by a wire-tooth rake?

A. I mean a sulky-rake, having curved teeth made of steel wire. They are used for gathering hay into windrows.

C. Int. 11. In what general direction do the teeth of such rake stand when mounted in position for raking—that is, are they vertical or horizontal?

A. Hardly either. They are curved approximately to a semicircle, with the concavity forwards, the points to the ground, and the butts above the points. The butts are secured to an axle-tree or a rake head.

C. Int. 12. Are these wire-tooth rakes you have mentioned the only kind of hay-rake you have ever made?

A. Yes, sir.

C. Int. 13. How many of them have you ever made?

311 A. From the raw material, I have made only three or four; but I have set up others for experimental purposes.

C. Int. 14. About how many others have you so set up?

A. I don't know; not over half a dozen.

C. Int. 15. What provision, if any, was made in these rakes for hitching the horse thereto?

A. They were hitched between thills or shafts in the ordinary manner.

C. Int. 16. When the horses were hitched in position what relation did they bear to the rake teeth?

A. They were in front of them.

C. Int. 17. Please state what kinds of hay-rake you have ever operated in the field.

A. The same kind—wire tooth—which I have above referred to.

C. Int. 18. Did you ever use such rake as you have mentioned in loading hay onto a ricker or stacker?

A. I never did.

C. Int. 19. Could such rakes be so used?

A. Yes, sir; they could.

C. Int. 20. Please explain how.

A. By filling them with hay in the usual manner, and then carrying such hay up onto the platform of the stacker, backing the rake off, and leaving it there.

C. Int. 21. The horses being in advance of the rake as it was drawn to the ricker platform, how would you manage the horses when they reached the ricker and yet secure the delivery of the load onto the ricker platform?

A. The horses could travel right over the platform, where
312 the platform was made of slats, like that of the Hill patent. If the platform were made of teeth he would have to switch the horses off sideways on the platform.

C. Int. 22. Having regard to the manner in which the shafts or thills are connected to the body of the rake on the wire-tooth rakes you have mentioned, explain how the horses could be switched off, as you have mentioned, when the ricker platform is reached, and the load be yet advanced onto that platform to be elevated.

A. The horses could advance over the teeth of the platform to the head of the same, and then be turned sideways, taking the rake over the teeth and off of the platform at one side. I don't say this would be a very good plan, but it could be done. The best way would be to use a Hill platform and drive right over it.

By agreement of counsel, the further cross-examination of the witness is postponed to enable Joseph Dain, Jr., to testify before leaving.

Pursuant to agreement between counsel, the further cross-examination of the witness, WILLIAM S. BATES, resumed:

C. Int. 23. Examine the "Complainant's Kirk Exhibit E," and state whether, in your opinion, the wire-tooth rake above referred to could practically be driven onto and off from the ricker shown in said exhibit in the manner you have already detailed.

A. If the elevating or pitcher teeth in Kirk Exhibit E were long enough the wire-tooth rake could be driven so as to bring its load onto those teeth and then backed off again; but it might also be driven up onto the elevator teeth and switched off sideways, and be operated in that way. I would not advise using it in that way, however, as there would be danger of breaking or injuring
313 the elevator teeth of the stacker by the wheel of the rake running over them or catching between them.

C. Int. 24. Would there be any danger of breaking the ricker teeth by the horses stepping on them as they advanced?

A. There might be, but the horse would soon learn to step between them, and a great many horses would know enough to do so from the start.

C. Int. 25. As a matter of every-day farmer's practice, do you wish to be understood, then, as stating that this mode of loading a ricker by the use of a wire-tooth rake, with the horses hitched in advance thereof, would be deliberately adopted by him as suitable to the purpose?

A. I hardly think it would. He would be more likely to get a very wide rake and use two horses with it, hitching them at the sides so as to keep them off the stacker teeth. The manner I have

described would be possible, however, but it would be too slow a method.

C. Int. 26. Suppose the stacker to be half filled, does it occur to you that the horses could advance over the load thereon, so as to bring the rake load in position for deposit?

A. No; they could not. For that reason it would be necessary to elevate small portions at a time.

C. Int. 27. Assuming the rake load to be deposited on the ricker as if in a windrow, do you think the horses could be backed off over such load, as a matter of common practice, without dragging it from the rake?

A. It would be difficult in a stacker like that shown in Kirk Exhibit E, but there are stackers in which the rake could be driven right on over the platform, leaving the load on the platform in the ordinary manner in which such rakes deposit their load.

314 C. Int. 28. These wire-tooth rakes you have been considering are for one or two horses, are they not, the same begin located at about the central portion of the rake head and in advance thereof?

A. Yes, sir.

C. Int. 29. Have you ever operated a drag-rake in which the horses were located one at each side of the rake?

A. No, sir.

C. Int. 30. Have you ever seen one operated?

A. I don't think I have.

C. Int. 31. Refer to the Defendants' Exhibits King Patent and Bean Patent and say whether or not they are fair illustrations of the prior art in the class of sweep-rakes having side-draft attachment, as mentioned in lines 12 to 32, column 1 of the printed specification of the Kenaga patent.

A. So far as they go they are. I should say, however, that the drawing of the Kenaga patent itself was the fairest illustration. Imagine the poles C C to be omitted, and the Kenaga drawing shows exactly the class of rakes known to the art at the date of Kenaga's invention. At least the specification so states in the lines referred to and line 37 to 40.

C. Int. 32. Is it not true that in these prior drag-rakes, having side-draft attachment, the load was usually discharged by wheeling the horses about and withdrawing the rake from under the load, as defined in the lines of the Kenaga patent referred to in my last question?

A. That was the usual way of discharging the rake; but some of the prior patents show rakes which could be discharged either that way or by backing the rake, the Hudson patent, in particu-

315 lar, being one of this kind. Most of the prior rakes could be discharged by backing them by simply adding to them the old and well-known thills and poles in the old and well-known manner.

C. Int. 33. Refer to the Exhibit King Patent and say whether the rake there shown was not to be unloaded by reversing the position of the horses, as indicated in the last question.

A. It is so described in the patent; but if the farmer took the thills or poles off a couple of his wagons and put them onto the rake it would be possible to discharge it by backing it from under the load.

C. Int. 34. Refer to the Exhibit Hudson Patent and say whether the rake there shown was not to be discharged of its load by turning the horses about and dragging the rake backward.

A. Yes; that is the statement of the specification; but by hitching the horses to the front ends of the poles C the rake could be backed from its load instead of being worked the other way.

C. Int. 35. The mode of operation in unloading the rake, as described in the King patent and Hudson patent, fairly illustrates, then, what Kenaga defines to be the prior art, in lines 12 to 32 of his patent specification?

A. Yes, sir.

Cross-examination continued by G. P. FISHER:

C. Int. 36. Would it make any material difference, in the operation of the poles in the Kenaga patent, if the rear ends of these poles were located at a short distance from the rake head instead of immediately at the ends, provided the outer ends of the poles extended to about the same position as that shown in the patent?

A. I don't think it would.

316 C. Int. 37. Would it make any material difference, in the operation of the Kenaga rakes, if the position of the poles was changed, as indicated in the preceding question, and if brace bars were extended from the extreme ends of the rake head to about a central point of the poles?

A. If no other change were made it would not.

C. Int. 38. Would it, in your judgment, require the exercise of invention upon the part of a skilled mechanic to make either of the changes indicated in the last two questions?

A. As I understand the construction indicated, what you call a "brace bar" is an entirely unnecessary and inoperative addition, and, as invention is necessarily accompanied by the accomplishment of some desired purpose, there certainly would be no invention in adopting the constructions suggested in the question. If, however, the new construction—namely, the addition of a brace—was beneficially operative, there might or might not be invention required for its adoption.

C. Int. 39. In the operation of backing the rake made in accordance with defendants' model is it not necessary that the projecting poles shall be formed of stiff material so that they will not bend?

A. Certainly.

C. Int. 40. In the operation of such rakes is it not also necessary that the poles should be stiff, as against movement in a lateral direction?

A. It is desirable, but is not necessary. The poles must be of stiff material, however.

C. Int. 41. If the poles in defendants' model were so connected to

the rake as to permit them to yield freely in a lateral direction, would such poles be practically operative for the purpose of backing and wheeling the rake?

317 A. Yes, sir.

C. Int. 42. As regards any lateral movement, are not the poles in defendants' model rigidly connected to the rake head?

A. They are—that is, to the rake head and draft bar.

C. Int. 43. Please describe the operation of a rake made in accordance with the Kenaga patent in backing the rake from beneath the load.

A. The horses simply pull back upon the hooks &c. This backs the rake.

C. Int. 44. Please describe the operation of a rake made in accordance with defendants' model when backing from beneath its load.

A. There is no particular operation about it. The horses pull back upon the ends of the poles and the rake moves backward.

C. Int. 45. Am I to understand, therefore, that in backing a rake made in accordance with the defendants' model and a rake made in accordance with the Kenaga patent the operation of the poles is the same?

A. The poles force the rake backward in both cases, just as any wagon pole does, and just as the poles in the Hudson, Whitney, and Currier patents force their machines back.

C. Int. 46. Is the operation of the poles, in the two forms of rakes referred to in the preceding question, the same in wheeling or turning the rake?

A. The poles have nothing to do with turning the rake. The rake is turned by making one horse move faster than the other.

C. Int. 47. Am I to understand, therefore, that so far as the operation of turning the rake is concerned the poles have no useful functions whatever?

318 A. None whatever, except as fenders to keep the horses off the teeth in the defendants' machine and possibly off the wheels in the Kenaga.

C. Int. 48. Please explain where there is a difference in the mode of operation of the poles of a rake made in accordance with defendants' model and a rake made in accordance with the Kenaga patent.

A. In backing the Kenaga rake the tendency will be to raise the teeth, whilst in the defendants' rake there is no such tendency. In the Kenaga rake the poles prevent raising the teeth off the ground to any extent when the rake is moving forward, owing to the weight of the poles and the fact that they would strike the horses under their chins, whilst in defendants' rake there is no such resistance and the teeth may be raised to a considerable extent.

C. Int. 49. Does not the Kenaga patent state that the horses are to be hitched to the poles by means of breast straps?

A. Yes, sir.

C. Int. 50. Will not such breast straps permit the teeth of the rake to be raised from off the ground when the rake is moving forward?

A. Yes.

C. Int. 51. If the outer ends of the poles in the Kenaga patent were sufficiently high with respect to the horses' breasts, would not the tendency in backing the rake from beneath the load be to depress the points of the rake teeth?

A. Yes; if the ends of the poles are high enough, but they would have to be up on a level with the horse's nose, or higher, to have that effect.

319 C. Int. 52. If the ends of the poles in the Kenaga patent were below the horses' noses some distance, and at such point that in the backing operation the breast straps should be about horizontal or inclining somewhat downwardly in a backward direction, would not the tendency be to retain the points of the rake teeth upon the ground?

A. It might or might not. In order that there be that tendency, the line of direction of the strain on the end of the pole must fall below the line of the pole.

C. Int. 53. If the line of the direction of the strain is substantially the same as the direction of the pole, would not the tendency be, when backing the rake, to retain the teeth upon the ground?

A. No, sir; I am speaking of the Kenaga rake, of course.

C. Int. 54. Why not?

A. Because the pole is connected directly to the axle, or above it.

C. Int. 55. Whenever the front ends of the poles in the Kenaga construction are so high that in the backing operation the strain of the breast straps tends to depress the poles, will there not also be a corresponding depression of the rake teeth?

A. Certainly.

C. Int. 56. Will these conditions not exist when the outer ends of the poles are above the breast straps?

A. Generally speaking, they would; but the pole might be so long that they would not.

C. Int. 57. Is it not a fact, therefore, that if the outer ends of the poles in the Kenaga construction extend to a proper distance in front of the horse and to the height of the breast strap, the tendency in the backing operation will be to move the rake teeth without lifting?

A. Yes; that is substantially correct.

320 C. Int. 58. Does the Kenaga patent require that the outer ends of the poles shall occupy any precise height?

A. No, there is nothing said about it.

C. Int. 59. In the operation of backing a rake made in accordance with the Kenaga patent, from beneath its load, would not the weight of the load be such as to allow the rake to move backward without elevating the teeth, even if the outer ends of the poles were somewhat below the level of the breast straps?

A. Yes, in most cases it would.

By agreement of counsel, the further taking of testimony is adjourned until Thursday, May 27, A. D. 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

THURSDAY, *May* 27, *A. D.* 1886—ten o'clock a. m.

Met pursuant to adjournment.

Present as before for defendants; G. P. Fisher, Esq., for complainant.

C. Int. 60. If the poles in a rake made in substantial accordance with the Kenaga patent have their outer ends projecting a sufficient distance in front of the horse and at a proper height with respect to the breast-straps, could not the rake teeth be sufficiently elevated to permit the rake to be drawn from the stacker back into the field without serious difficulty?

A. Certainly; but if arranged at a proper height for that purpose they would necessarily be low, and there would be a strong upward pull on the teeth in backing.

C. Int. 61. If the outer ends of the poles in such form of rake were at a sufficient distance in front of the horse and at a proper height with respect to the breast straps to permit the teeth to be prop-
321 erly elevated in going back into the field, might not the rake be backed from beneath the load of ordinary weight without elevating the rake teeth?

A. It would depend somewhat on the relative weight of the load and resistance of the rake to backing. I am speaking of poles just as shown in the Kenaga patent, in which it is necessary to keep the end of the pole down, so that it or the strap will not strike the horse in the nose. By placing the pole at the side of the horse, as shown in the Hudson patent and in the lithograph, which I now hold in my hand, the teeth could be properly elevated and also the rake be backed without raising the teeth.

(Counsel for defendants offers in evidence lithograph referred to by the witness, and the same is marked "Defendants' Exhibit Acme Lithograph, 1886.")

C. Int. 62. What changes would it be necessary to make in the poles of the Kenaga patent in order that the rake could be successfully operated in backing the rake from beneath the load and in elevating the teeth to go back into the field?

A. I would either make hinged poles of them, as in the defendants' machine, or arrange them alongside the horse, as in the Hudson patent and Acme lithograph machine.

C. Int. 63. If the poles in the Kenega patent were arranged as you have indicated in your last answer the rake would be a decided improvement, would it not, over a drag-rake like it in all particulars except with the poles omitted therefrom?

A. It would be an improvement.

C. Int. 64. Do you find in the specification of the Kenaga patent or in the claim at the end of such specification any statement
322 that the invention there shown is restricted to a rake in which the poles are extended to any particular degree in outward direction or to any particular height?

A. Only the statement that the "free front end of each is in po-

sition to allow the adjacent horse to be hitched thereto by a breast strap."

C. Int. 65. Do you find any statement in the specification or claim of the Kenega patent that the "iron hooks *c*" must in all cases be employed?

A. No.

C. Int. 66. Would it, in your judgment, require the exercise of invention upon the part of a skilled mechanic to omit the iron hooks from the ends of the pole and employ instead thereof the ordinary means for connecting the breast strap of a horse to the wagon pole?

A. It would not, and that is why I have stated in a former answer that the Hudson patent contained the improvements set forth and claimed in the Kenega patent. The Acme lithograph is a very fair illustration of the Hudson machine, with the horses hitched to the pole in front.

C. Int. 67. In your judgment, therefore, the rake shown in the Exhibit Acme Lithograph is not a material departure from the Kenaga patent so far as the poles and their manner of connection to the rake head and the horses is concerned?

A. No; neither the lithograph or the Hudson patent, unless the court should see fit to limit the Kenaga patent to the exact form shown.

C. Int. 68. As compared with a drag-rake of the old construction having no projecting poles, what would be the capacity for a day's work of a machine made like the rake shown in "Defendants' Exhibit Acme Lithograph"?

323 A. I should think it would be about the same or very nearly so. By a drag-rake of the old construction I assume you to mean a rake like the Kenaga, with the poles omitted.

C. Int. 69. Is there not a material advantage obtained by providing the old form of drag-rake with means whereby it can be backed from beneath the load, and also to avoid obstructions in the field?

A. Yes; there is an advantage in those respects.

C. Int. 70. With the old form of drag-rake, in which two riders were employed, would there not be great difficulty in getting the rake load onto the ricker?

A. Not that I know of. I don't see that there would be. Of course the machine can be handled a little better where both horses are managed by a single person.

C. Int. 71. In the old form of drag-rake, wherein two riders were employed, would there not be considerable danger of breaking the teeth of the rake or of the platform when the riders advanced the rake onto the platform or turned the horses to withdraw it therefrom?

A. That would occur sometimes when the boys were careless.

C. Int. 72. Is not this difficulty overcome by providing means for attaching the horses to poles at the sides of the rake?

A. It lessens it by bringing both horses under one control, but if the one operator were careless he could break the teeth as well as the two boys.

C. Int. 73. Please explain how the horses are attached to the rake shown in Defendants' Exhibit Pennock Patent.

324 A. The horses are hitched to whiffletrees, which are connected to the hooks *q q* and in front of the end teeth of the rake, one at each side.

C. Int. 74. Do you find in the specification or drawing of the Pennock patent any means provided whereby the horses may back the rake out from beneath its load?

A. No; there is another arrangement for discharging the load, but the rake could be easily arranged to back out from the load by either adding a pair of tongues or thills taken from the farm wagons or by extending the bars *g* farther forward to hitch the front end of the horse to.

C. Int. 75. Please describe how the load is to be discharged from the Pennock rake.

A. The arrangement shown in the patent consists of a gauge-board extending across the teeth from side to side of the machine. This board is worked back by the gathering hay and friction on the ground towards the base of the teeth. The board and the rake are connected to the draft by eveners, and when it is desired to discharge the load the operator presses the rake head against the ground and eases the board from it and the horses draw the board to the front of the teeth, thus pulling the load off.

C. Int. 76. If a pair of tongues or thills were placed upon the Pennock rake, as indicated by you in C. Int. 74, they would be attached in front of the rake teeth, would they not?

A. I should prefer to attach them to the bars *g*, which are connected back of the rake teeth.

C. Int. 77. If such attachment were made the horses would be in front of the rake teeth, would they not?

A. In front of the end teeth; yes.

325 C. Int. 78. Would a rake made in accordance with the Pennock patent be capable of successful operation in loading hay onto a ricker?

A. Yes; I think it would.

C. Int. 79. Please explain in what manner it could be operated for such purpose.

A. I would make it of such dimension that the ricker platform would fit in between the bars *g*; then I would cut off the teeth outside of the bars *g* and operate the machine just exactly as the Kenaga machine operates. If the machine were to be used with a ricker of the style shown in the Hill patent of 1875 it could be used just as it is by driving the whole concern onto and over the platform.

C. Int. 80. Assuming the construction to be that indicated in the drawings and specifications of the Pennock patent, explain how it would be possible to operate the Pennock machine just exactly as the Kenaga machine operates.

A. My former answer referred to getting the hay onto the platform, in doing which the operation of the two machines would be identical. To get the rake clear of the load, with the ordinary toothed platform, the best plan would be for the operator to pull it

back or else put on poles for the horses to back it off; but with the Hill style of platform it could be driven right over the load and turned and moved off when the load was raised.

C. Int. 81. How are the short poles *g* attached to the rake head in the Pennock patent?

A. Apparently by a staple passing through an eye at the end of the pole.

C. Int. 82. These short poles of the Pennock patent are therefore freely movable in a lateral direction, are they not?

326 A. I think not. There are either two staples to each pole, one on each side, or one long staple. The drawing is not perfectly clear upon this point. The specification says, "On the anterior edge of the upper side of the rake head, at equal distances from the ends, are attached, by means of strong hooks and eyes, two shafts about three feet long."

C. Int. 83. Is it not a fact that the drawing of the Pennock patent shows the short shafts *g* provided with hooks and the rake head provided with eyes or staples with which such hooks engage?

A. Not distinctly. That may be the construction, or it may be that the hooks are on the rake head and the eyes on the shafts.

C. Int. 84. If the eyes or staples on the rake head in the Pennock patent extend in the direction of its length and the hooks on the shafts or bars *g* had their free ends pointing in a forward direction would not a backward pressure upon these shafts force the hooks from out the eyes and so detach the shafts?

A. Yes; unless they were snap hooks or something of that sort.

C. Int. 85. Is there anything in the specification of the Pennock patent which would suggest the desirability of extending the poles *g* to a greater extent than there shown?

A. No, sir.

C. Int. 86. Please explain how thills would be attached to the rake shown in the Pennock patent.

A. They could be attached in any ordinary manner to the bars *g* or to the rake head.

C. Int. 87. How could thills be attached to the bars *g* and to the rake head?

327 A. With screws, bolts, nails, or hinges, or any other fastening device.

C. Int. 88. Do not thills usually have two points of attachment?

A. Commonly they do, though sometimes, as in certain one-horse mowers, the shafts are brought together behind into a single bar.

C. Int. 89. Please explain how the rear bars of the thills would be connected to the front ends of the short shaft *g*.

A. They could be placed above or below or beside the bars *g* and bolted through.

C. Int. 90. With a single bolt?

A. Yes; or more, as desired.

C. Int. 91. Would not a single bolt allow the thills to move laterally?

A. Either laterally or vertically, according as they were secured to the side or to the top and bottom of the bar *g*.

C. Int. 92. Explain how you would attach thills to the rake head.

A. By the ordinary thill coupling or by any other common fastening.

C. Int. 93. At what point of the rake heads would you attach them?

A. To the top, near the ends.

C. Int. 94. Would it not be necessary in so attaching the thills to the Pennock machine to provide draft bars or remove some of the end teeth?

A. It might be desirable, though the thills could be made long enough to reach over the teeth, so that the horse would not step on them.

328 C. Int. 95. Does the Lyman & Baldwin patent show a drag-rake, as this term is commonly employed in the art?

A. No, hardly; though it shows a combination of a similar rake, a hay-loader, and a wagon.

C. Int. 96. In your direct examination you state that "the Lyman & Baldwin patent describes a rake like that of complainant's patent." is it not a fact that the Lyman & Baldwin patent shows two rakes adapted to work alternately?

A. Yes: but the specification states that one may be used alone.

C. Int. 97. Having reference to the purpose and mode of operation of the Lyman & Baldwin rake, should not the lower rake teeth be short as compared to the teeth of the rake designed to operate in conjunction with a hay rake?

A. I think not. I don't see why they should be.

C. Int. 98. Referring to the drawing of the Lyman & Baldwin patent, are not the teeth of the inside rake about the same proportion as those of the outside rake?

A. They appear to be a little shorter.

C. Int. 99. About what is the length of the teeth in a drag-rake of the class shown in the Kenaga patent?

A. From six to eight feet.

C. Int. 100. Having reference to the other parts of the structure of the Lyman & Baldwin rake, about how long would you say the rake teeth to be?

A. Two or three feet.

C. Int. 101. Is the pole in the Lyman & Baldwin patent to which the horses are hitched connected to the rake head?

A. Apparently it is connected to the axle of the wagon and not to the rake head.

329 C. Int. 102. In using the Lyman & Baldwin machine for the purpose of conveying hay to a ricker platform it would be necessary, would it not, to dispense with the main features of such construction and reorganize the hay-loader?

A. It would not be necessary to change the Lyman & Baldwin machine. It can be used with the ordinary hay-rickers. It might be desirable, however, to omit some of the parts shown and described in the patent simply to have them out of the way and get rid of their weight.

C. Int. 103. Would it not be necessary to retain the wagon bottom?

A. Such portion of it as is necessary to connect the tongue with the rake head, unless the tongue were fastened directly to the rake head.

C. Int. 104. Would it be practical to use the Lyman & Baldwin machine for the purpose of loading hay onto a ricker platform, and what would its capacity for a day's work be as compared with the ordinary drag-rake, assuming the various parts of the Lyman & Baldwin machine to be constructed in accordance with the specification and drawings of the patent?

A. It would be possible to use it, but its capacity for a day's work would be less.

C. Int. 105. As compared with the ordinary drag-rake the use of the Lyman & Baldwin machine for the purpose of loading hay onto a ricker would not be desirable, would it?

A. I should prefer the drag-rake.

C. Int. 106. Does Defendants' Exhibit Roney Patent show any means for raking hay?

A. No, sir.; that is a mowing machine.

330 C. Int. 107. If rake teeth were substituted for the finger bar would not such substitution utterly destroy the Roney machine?

A. It would destroy its purpose for cutting grass or grain, but would enable its use for the purpose of raking hay.

C. Int. 108. Please explain how rake teeth could be attached to the Roney machine in order to make it practically operative for the purpose of loading hay onto a ricker platform.

(Question objected to, for the reason that the question is limited to one special form of stackers, while the complainant's patent is not so limited, but includes stackers of all varieties, a large number of which have no platforms.)

A. Simply attach the teeth in the place of the fingers on the finger bar.

C. Int. 109. Would it not be necessary to provide some means for preventing the hay from passing over the rear ends of the teeth; also to incline the teeth in a different direction from the finger bar; also to do away with a large part of the structure that is employed for driving the cutter bar?

A. It would be necessary to provide a board or something to keep the hay from passing over the back ends of the teeth. The rake teeth might or might not be inclined in a different way from the fingers. They should incline downwardly, so as to bring the points to the ground. It would probably be a good thing to remove the mechanism that drives the cutter bar, but the machine would operate all right without removing it.

C. Int. 110. Assuming that the only change made in the Roney machine was the substitution of rake teeth for the finger
331 bar, would such machine then be capable of successful operation as a hay-rake as compared with the old form of drag-

rake, in which the horses were hitched at the ends of the machine, but were not attached to poles?

A. Yes, sir; of course it would not be as rapid in its working as the old drag-rake, because it is a heavier machine. It would possess one advantage over the old drag-rake—it could be backed away from an obstruction.

C. Int. 111. Assuming that no other changes were made, would the capacity of the Roney machine be equal to that of the ordinary drag-rake, and would not the weight of the structure, the fact that the hay could pass off the rear ends of the rake teeth, and the fact that there would be a constant working of the gear-wheels all prevent the sale of such a structure or its adoption for raking hay where the old form of drag-rake could be obtained?

A. Its capacity would not be as great as the old drag-rake, and the reasons mentioned in the question would affect its general adoption, because it would make it more costly and cumbersome. A great many parts could be omitted, however, and would be when the machine was used for raking.

C. Int. 112. If such parts were not omitted would not the objections mentioned absolutely prevent the adoption of such a machine, in your judgment?

A. I don't know. The farmers might prefer using this machine, which would do for both mowing and raking, to buying two separate machines for those purposes.

C. Int. 113. Do you find any statement in the Roney patent that would in anywise suggest to a skilled mechanic the advantage of using rake teeth instead of the finger bar in such a structure?

A. I do not.

332 C. Int. 114. In the Defendants' Exhibit Currier Patent is there shown or described any machine capable of raking hay without entirely changing the purposes of such machine?

A. The machine being a corn-harvester or machine for cutting and uprooting cotton stubble, it would, of course, entirely change its purposes to adapt it for raking hay.

C. Int. 115. Is there any suggestion in the Currier specification which would lead a skilled mechanic familiar therewith to employ any features of such machine in a horse hay-rake?

A. No; suggestions are not necessary. The mechanic would know enough to do it without suggestions.

C. Int. 116. Is there any special advantage to be obtained from backing the machine shown in the Currier patent?

A. There may be when it runs into an obstruction or gets into a corner where there is not room to turn it.

C. Int. 117. Please state whether in the Currier patent there is any statement that the horses are to be attached to the projecting shafts G.

A. There is no direct statement to that effect, but that is the obvious intention. In fact, it is a necessity, the machine being a sulky or two-wheeled machine.

C. Int. 118. Is it necessary to the successful operation of a two-

wheeled machine having projecting bars or poles that the horses should be attached to the ends of such poles; if so, why?

A. It is necessary in order to keep those poles off the ground, especially where downwardly projecting parts of the machine act upon a stubble whose resistance tends to depress the poles.

333 C. Int. 119. What is the object in separating the horses in the Currier machine and at what distance should they be separated to accomplish the purposes of the Currier invention?

A. The object is to take in the crop between the horses, just as is the case in the Kenaga and similar rakes. The distance apart of the horses in harvesting corn should be about four feet, which is somewhat less than is desirable in harvesting hay. Cotton, I presume, is similar to corn.

C. Int. 120. Is there any statement in the Defendants' Exhibit Mason Patent tending to indicate that the device there shown is designed to be applied to a drag-rake?

A. No, sir.

C. Int. 121. Please state how these thills might be applied to the Pennock patent, stating particularly how and at what points the attachment will be effectual.

A. They might be attached to the rake head by means of the curved arms H I in any ordinary manner, such as by the ordinary thill coupling, or the arms H I might be attached to the bars *g g* of the Pennock patent, if the distance between them were right, or the thills might be separated to make the distance right.

C. Int. 122. Would it not destroy the purpose of the Mason invention to separate the thills?

A. I don't see that it would. By "separate" I meant to place them further apart, but still joined.

C. Int. 123. If the thills of the Mason patent were applied to the rake of the Pennock patent in the manner suggested by you, would the machine so produced be as practically successful a machine for the purpose of loading hay upon a ricker platform as the ordinary drag-rake?

A. I think it would.

334 C. Int. 124. If the thills were attached to the Pennock machine in the manner suggested by you the horses would be in front of the rake-teeth, would they not?

A. In front of some of them; but when the thills were separated as I suggested there would be a clear space between the horses in front of the teeth.

C. Int. 125. In the rakes shown in Defendants' Exhibit King Patent the horses are to be attached to pivoted bars and to be reversed to draw the rake backward, are they not?

A. That is the intention.

C. Int. 126. If the thills of the Mason patent were applied to the rakes shown in the King patent, would not the horses in backing elevate the rake teeth from the ground?

A. That would depend on how the thills were applied. If applied to the rake head by the ordinary thill coupling they would not raise the teeth.

C. Int. 127. If poles or shafts such as are shown in the Currier patent were attached to the King rake in the manner shown in the Currier patent, would it not be necessary to extend said poles or shafts in an upward direction?

A. If attached directly to the rake head it would be. If attached to the swinging frame or to the upper cross-bar above the axle rake head they would not necessarily extend upward.

C. Int. 128. Would not the attachment of poles or thills to the King rake totally destroy the purposes of the King invention?

A. No; I think not.

335 C. Int. 129. Is not the swinging frame K of the King patent a material element of the King invention?

A. It is; but the purpose of the invention is to collect hay from different parts of the meadow and convey it to some given point.

By agreement of counsel, the further taking of testimony is adjourned until Friday, May 28, A. D. 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

FRIDAY, *May* 28, *A. D.* 1886—ten o'clock a. m.

Met pursuant to adjournment.

Present as before.

C. Int. 130. If the horses were attached by thills to the swinging frame K of the King patent, would not such thills be freely movable in a lateral direction, with respect to the rake head, and would it not be necessary, therefore, to employ separate riders for the horses, as in the old form of drag-rake?

A. The thills would be laterally movable, and it would not be necessary to employ separate riders. One man could manage both horses, and the rake could be backed away from its load or from an obstruction.

C. Int. 131. If thills were attached to the swinging frame K of the King patent in the manner suggested by you, would the machine so modified make as practically successful machine, for the purposes of loading hay onto a ricker platform, as the ordinary drag-rake?

A. If he would cut off the second set of teeth at the back of the rake head, so as to make it single acting, it would be better than the old drag-rake, because it could be backed away from its load

336 or an obstruction, and the horses could be swung around and draw it backward at a rapid pace to and from and over the field.

C. Int. 132. In your judgment, therefore, it is not necessary to the success of the King rake, modified by the connection of thills to the swinging frames, that the frames should be guarded against movement in a lateral direction?

A. It is not.

C. Int. 133. At what point of the swinging frames would the thills be attached in modifying the machine of the King patent as suggested by you?

A. They would be connected to the front and rear uprights of

the frame, at whatever height was suitable. They might be connected to the laterals *k'* if they were at the right height.

C. Int. 134. If thills were attached to the machine of the King patent, would it not destroy the mode of operation of such machine as defined in the patent?

A. No, sir. It could be operated in the same way. The only operation described in the patent is for discharging the load. "The horses are turned around and the rake drawn from beneath the hay." This could still be done when thills were used or the rake could be backed from beneath the hay, as preferred.

C. Int. 135. For purposes of practical field operation would it not be necessary to employ separate riders for the horses in order to turn them about in the manner defined in the patent, even if thills were employed?

A. No, sir. The horses could be turned in both manners by one man at the center of the rake.

C. Int. 136. Would this be a practical way of operating the King rake with the suggested modification?

A. I think it would.

337 C. Int. 137. Please explain the position of the driver of the King rake as modified during the operation of turning the horses about.

A. The best place for him would be on a pivoted seat at about the middle of the bar G, though he might stand on the ground just behind the rake or on the rake head itself.

C. Int. 138. In your judgment would this be a practical way of operating the King rake as modified?

A. It would.

C. Int. 139. In your judgment could the ordinary field hand from a position on the rake at the same time manage both horses in the turning operation?

A. If he could manage horses at all he could.

C. Int. 140. Would the rake shown in Defendants' Exhibit Wicks Patent be practically operative for delivering hay on a ricker platform?

A. On some kinds of platforms it would be.

C. Int. 141. Please explain the manner of operating the Wicks rake for the purpose of loading hay upon a ricker platform.

A. With a slat platform the rake could convey its load right up onto the platform and dump it there and pass on over it, and when the platform was raised to elevate the hay the rake could be driven out from under it. In a platform composed of teeth the same thing could be done, unless there was a raised head at the back that the team could not get over.

C. Int. 142. It would be necessary, would it not, in the use of the Wicks machine for delivering hay to a ricker platform that the horse should pass onto and over the platform?

338 A. Yes, sir; generally speaking. They might in some cases be backed off without passing entirely over the platform.

C. Int. 143. With ricker platforms having raised heads at the back the Wicks machine would not be practically operative, would it?

A. It could be worked. It would hardly be practically operative.

C. Int. 144. The mode of operation of the Wicks machine is to turn over or revolve the rake teeth, is it not?

A. Yes, sir; that is the way it dumps its gathered load.

C. Int. 145. Referring to the Defendants' Exhibit Fowler Patent, would not the same remarks made by you with respect to the machine described in the Defendants' Exhibit Wicks Patent apply also to the machine of the Fowler patent?

A. Yes; they would.

C. Int. 146. Would it not be necessary to extend laterally the rake heads of the machine shown in the Defendants' Exhibit Middlecoff Patent in order to permit the attachment of thills to such rake?

A. No. Thills could be attached just as the ropes M L are and made long enough to have the horse in the same position as with the ropes. I refer to thills which are brought together into a single bar behind. With ordinary wagon thills it would be necessary to extend the rake head or the bar A out a little. The thills of the Mason patent would not require this. Poles could be attached without extending the rake head—such poles as those of the Currier patent.

C. Int. 147. If the thills of the Mason patent were attached to the Middlecoff machine the horses would be in front of the reke teeth, would they not?

339 A. Not necessarily; of course the cross-bar E in the Mason patent would have to be made long enough to reach across the rake so that the connections H and I would come at the end of the bar A of the Middlecoff drawing.

C. Int. 148. If poles were attached to the ends of the Middlecoff machine would it not be necessary to mount the machine on wheels in order to permit it to be successfully backed from beneath its load?

A. On wheels or runners; but this could be done by any farm boy.

C. Int. 149. If poles were attached to the Middlecoff machine at what point and in what manner would such attachment be made?

A. They could be attached to the rake head B and the end standard *f* and to the brace D.

C. Int. 150. If the poles were so attached would not the horses in the backing operation elevate the rake teeth?

A. It would depend on the height of the end of the pole. If the poles were arranged like those of the Acme lithograph I don't think the teeth would be raised.

C. Int. 151. If poles or thills were attached to the rake, shown in the Defendants' Exhibit Bean Patent, would it not be necessary also to provide means whereby the load should be pushed off the rake teeth after the machine was driven onto a ricker platform?

A. The Bean machine could then be backed from under the load. Of course it would be desirable to have something to keep the hay from going back with the rake, such as barbs on the front of the

platform. Such barbs are frequently employed on the points of rake teeth.

340 C. Int. 152. It would be necessary to make some such provision, would it not, in order to render the Bean machine successfully operative for loading onto a ricker platform?

A. No; not necessary; but it would be necessary to make it leave its entire load and not spill some of it over the ground.

C. Int. 153. If rake teeth were applied to the machine of the Defendants' Exhibit Patton Patent it would entirely destroy the purposes for which such machine was devised, would it not?

A. The Patton being a corn-harvester, it certainly would.

C. Int. 154. If rake teeth were applied to the Patton machine in what manner would they be attached thereto?

A. They might be attached to the lower front end of the frame O in the same manner that they are attached to anything else.

C. Int. 155. Would they not then project so far forward as to interfere with the horses?

A. It would depend on their length.

C. Int. 156. If the teeth were long enough to accumulate a load of any considerable size for deposit upon a ricker platform such interference would occur, would it not?

A. It probably would; but in that case the rake teeth could be attached to the axle or some part of the frame farther back or the thills could be lengthened out so as to have the horses farther forward.

C. Int. 157. If rake teeth were applied to the Patton machine in the manner suggested it would be necessary, would it not, for the horses to pass onto the ricker platform in order to deposit the load?

A. They might do that or they might be set a little
341 farther apart; as shown in the drawing they are about four feet apart.

C. Int. 158. If no further changes were made in the Patton machine than to apply the rake teeth thereto would such modified machine, in your judgment, be as practically successful or desirable as the ordinary drag-rake for the purpose of loading hay onto a ricker platform?

(Objected to for the reason that no hay-rake is limited in its use to a ricker platform.)

A. It would be as successful; but, being more ponderous, not quite as desirable. If built lighter, the superfluous material being left off, it would be just as desirable.

C. Int. 159. If no other changes were made in the Patton machine than the substitution of rake teeth in the manner suggested by you would the capacity of the rake be as great as that of the ordinary drag-rake, and would it be practical to load with such modified machine onto a ricker platform having raised portions at the back?

A. If the proportions of the machine were exactly those of the drawing of the Patton patent it would not, but with slight changes in the proportions it would.

C. Int. 160. If rake teeth were substituted for the cutting knives,

A. If the horse turned a little sideways he could strike the end of the arm.

C. Int. 178. Could this be possible if the ends of the arms C extended as far forward and as high as the horse's shoulder?

A. I think it would be possible.

C. Int. 179. From an examination of the specification and drawing of the Hudson patent how long would you say the projecting arms to be?

A. I should think, altogether, eleven or twelve feet. I base this estimate on the statement of the specification, that the wheels are fifteen feet apart and the prongs eight feet long.

C. Int. 180. Referring to the purposes of the Hudson invention, in what way do you understand that the horses would be attached to the rake?

A. They are to be hitched to shackles on the outer ends of the wheel spindles, presumably by the use of single-trees, though the patent does not mention the latter.

C. Int. 181. Assuming the horses to be attached by single-trees to the links on the ends of the axles in the Hudson machine, would it be practicaly possible to attach the horses by their breast straps to the ends of the projecting arms C?

346 A. I don't know about breast straps, but they could be attached by means of short chains in the manner shown in the Acme lithograph.

C. Int. 182. How long should such chains be, assuming that the ends of the bars extend forward to the front of the horses' breasts?

A. They might be quite short in that case; say eighteen inches long.

C. Int. 183. Would it not be necessary to modify the arms C of the Hudson machine by providing them with means whereby the chains could be connected thereto?

A. It would be convenient to have a staple or loop or hook at the end of the arms. That could easily be put on.

C. Int. 184. In attaching the horses to the Hudson machine by single-trees would not some provision be necessary in order to prevent the single-trees interfering with the wheelsof the machine?

A. I have supposed, in the last three answers, that the single-trees were in front of the wheels, being connected by chains with the shackles on the axles.

C. Int. 185. About what would you say would be the distance in a machine built in accordance with the Hudson patent between the forward ends of the arms C and a vertical line bisecting said arms from the front edge of the wheels?

A. Such a line would just about bisect the arms, and that would leave about five and a half feet from the line to the forward end of the arm.

C. Int. 186. Would it not be necessary to attach the single-trees so that they would be held a slight distance in front of the wheels?

347 A. Yes; an inch or two. That would leave over five feet at the end of the bar, which would be sufficient to contain a horse.

C. Int. 187. Assuming the horses to be connected by single-trees and by short chains to the arms C of the Hudson machine, and assuming the length of these arms to be as you have stated, would there not be constant danger of the horses interfering with the wheels in the operation of backing the rake?

A. No; I think not. The horses might have to back a little sideways to avoid the wheel, but they would do that naturally, anyhow, owing to the end of the pole C being at one side and not square in front.

C. Int. 188. Assuming that the single-trees were connected so as to be, as you have stated, no more than an inch or two from the wheels, and assuming that short chains were employed for connecting the horses to the ends of the arms C, would not the horses, in backing, be in constant danger of striking the wheels of the machine?

A. They would be in some danger, of course.

C. Int. 189. For the purposes and under ordinary conditions of field operation would not this be a serious objection to the use of such machine?

A. I think not. I have seen horses in an omnibus hitched just as close to the wheel, and it did not seem to trouble them in backing.

C. Int. 190. Assuming the horses to be connected to the arms C of the Hudson machine by eighteen-inch chains, as suggested by you, and assuming that the single-trees were but an inch or so in front of the wheel, would not the horses, in the backing operation, strike the wheels before the breast chains were tightened?

348 A. I don't remember what the exact length of a horse is. It would depend upon that. If it were found that he did strike the wheel it would be a very simple matter to hitch him up closer in front, and, if necessary, the arms could be very easily lengthened six inches or a foot to keep him clear of the wheel. As shown in the patent drawing the arms, I think, are long enough. Another way would be to lengthen out the axle, as shown in the Bean patent, so that the single-tree could be drawn farther back.

C. Int. 191. Would it not, in your judgment, materially improve the Hudson machine to lengthen the arms C and to extend the axles in a lateral direction?

A. Yes; it would improve the machine.

C. Int. 192. Assuming the length of the arms of the Hudson machine to be as stated by you, and assuming the horses to be attached by chains thereto, would not the rake teeth be elevated in the operation of backing the machine unless the rear ends of the bars were attached at a lower point than shown in the Hudson drawing?

A. On the contrary, the teeth would be depressed, owing to the pull being somewhat downward on the end of the arm.

C. Int. 193. Do you find in either of the defendants' patent exhibits any construction in which the horses are attached at the sides of the rake and are controlled by a single driver?

A. In the King, the Middlecoff, the Hudson, and the Bean the

horses are hitched at the side of the rake. It does not appear whether they are controlled by a single driver, but they evidently could be in some of these machines. The Acme lithograph shows how both horses are controlled by a single driver in a machine like the Hudson. Some of the other patents show constructions in which the horses are attached at the sides of the machine so
349 as to be controlled by a single driver, in exactly the same manner as in the Acme lithograph and in the Kenaga patent. These other machines are corn-harvesters instead of rakes.

C. Int. 194. In the Hudson and King patents is it not stated that the horses are to be turned about to withdraw the rake from its load, just as in the old form of drag-rake?

A. They say nothing about the old form of drag-rake; otherwise you are correct.

C. Int. 195. Is it not a fact that it was deemed necessary in the old form of drag-rake to employ separate riders for the horses, and does not the Hudson patent state that there should be a rider upon each horse?

A. Yes, sir. By "drag-rake" I suppose you mean what Kenaga calls "sweeps" in his patent.

C. Int. 196. Would there not be serious difficulty on the part of a single driver in controlling horses hitched at the end of a rake like the Hudson or King rake unless the horses were connected to poles projecting in a forward direction?

A. If the horses were free, of course they would be likely to get mixed up and turned around.

C. Int. 197. In the corn-harvester patents referred to by you in your answer to C. Int. 193 the horses are only separated the distance between the rows of corn, are they not?

A. Yes.

C. Int. 198. Without practical test being made would not there exist reason for doubting that two horses connected so far apart as the ends of the ordinary sweep could be practically controlled by a single driver?

A. No, sir; I think not.

350 By agreement of counsel the further taking of testimony is adjourned until Saturday, May 29, A. D. 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

SATURDAY, *May 29, A. D.* 1886—ten o'clock a. m.

Met pursuant to adjournment.

Present as before.

C. Int. 199. If thills were employed in the constrution shown in the Kenaga patent would it not be necessary, in order to produce a practically successful machine, that poles should also be provided for the purpose of guiding the horses?

A. I think not. My opinion is substantiated by the Kenaga speci-

fication, which suggests their use as a convenience, but not as a necessity.

C. Int. 200. Would it not be a decided advantage to employ poles in connection with the thills?

A. I think not; I don't see how it would be.

C. Int. 201. Unless poles were so employed would there not be danger of the horses breaking the thills in the operation of backing or turning or wheeling the rake?

A. No more than there is of breaking the poles when they are used instead of thills.

Redirect examination:

R. D. Int. 202. For what purpose, if any, is lateral rigidity of the pole useful or desirable in the complainant's or in the defendants' rakes?

A. It keeps the horses from getting on the rake teeth. It also slightly lessens the effort of backing.

R. D. Int. 203. So far as keeping the horses off the rake is
351 concerned, what advantage, if any, does the rake of the Kenaga patent possess over those of the Hudson and Rumrill patents?

A. None whatever.

R. D. Int. 204. In your cross-examination you have several times mentioned the Hill stacker or ricker. Please look at Complainant's Exhibit Kirk Drag Rake and say whether or not the cut or picture in said exhibit shows the stacker or ricker so referred to by you.

A. It does.

Recross-examination:

R. C. 205. If no change whatever were made in the machine shown in the Defendants' Exhibit Rumrill Patent, would there not be danger of the horses getting their front feet on the rake teeth, particularly if attempt were made to control the horses by a single driver?

A. If the teeth were seven or eight feet long, as in many of these rakes, there would not be. If, however, the teeth were only two or three feet long, the horses could get onto them.

R. C. 206. Assuming the teeth of the Rumrill patent to be eight feet long, and assuming the horses to be hitched in front of the wheels to the rope shown in the patent drawing, how far forward and how high, with respect to the body of the horse, would the front portions of the rods F extend?

A. The rods would extend clear to the front end of the horse, and would be from two to two and a half feet high at that point.

R. C. 207. Please designate, by a pencil mark on the drawing of the Rumrill patent, the point referred to by you in your last answer.

352 A. I have marked Fig. 1 with a mark which I have marked P. M. The horses' front legs would be at or back of this mark.

R. C. 208. Assuming the rake teeth of the Rumrill machine to be

eight feet long, what would be the distance between that part of the rods marked by you with the line P. M. and the part of the rods directly above the front of the wheels?

A. I assumed the horse to be about five feet long, and I allowed that space from the front of the wheel to the line P. M.

R. C. 209. If no change were made in the Rumrill machine, and if horses were connected to the rods F, would the rake teeth not be elevated in case attempt were made to back the machine?

A. If the third wheel H permitted the rake teeth to raise they probably would be elevated.

R. C. 210. Would not the plates G of the Rumrill patent prevent the rake from being backed from beneath its load?

A. Yes; I should think they would.

Counsel for defendants offers in evidence the provisional English patent No. 2736, of 1868, to Thomas Perkins, for improvements in elevators or apparatus to raise agricultural produce onto carts or stacks, dated September 4, 1868, and the same is marked "Defendants' Exhibit Perkins Patent."

For the purpose of illustrating the art in relation to stackers counsel for defendants offers in evidence specifications and drawings of United States patents as follows, to wit:

No. 19087, granted to J. H. Gill, for a hay elevator, dated January 12, 1858, and the same is marked "Defendants' Exhibit Gill Patent."

353 Also No. 44761, to F. Wicks, for a derrick, dated October 18, 1864, and the same is marked "Defendants' Exhibit Wicks Stacker Patent."

Also No. 54213, to C. Rundell, for a hay-stacker, dated April 24, 1866, and the same is marked "Defendants' Exhibit Rundell Patent."

Examination of witness continued on matters set up in amended answer.

Int. 208. Have you examined and do you understand Defendants' Exhibit Perkins Patent, and have you had any drawing or drawings made to show the structure described in said provisional patent; and, if so, will you produce the same?

A. I have examined and do understand the Perkins English patent. I have had a drawing made to show the structure described for gathering and elevating cut crops from the ground. This drawing I now produce.

Counsel for defendants offers in evidence the drawing referred to by the witness, and the same is marked "Defendants' Exhibit Drawing of Perkins Patent."

Int. 209. Would a mechanic skilled in the art have any difficulty in constructing the apparatus described in said Perkins patent for gathering cut crops from the Perkins specification?

A. No, sir; none whatever. The description is very clear.

Int. 210. State whether or not you find embodied in the Perkins rake, either in substance or in form, the combination claimed in the

complainant's Kenaga patent, and give your reasons for any opinion you may express.

A. I do find in the Perkins rake exactly the combination
354 set forth and claimed in the complainant's Kenaga patent. The Perkins patent describes and the drawing which I have made from it shows a rake for gathering hay, which rake has two horses, one attached at each side or each end of it. The horses are harnessed between thills, or the patent states they may be harnessed to poles. Consequently, both horses can be managed by one and the same person, and they can back the rake, when desired, either away from an obstruction or from under its load. The Perkins rake carries its elevator with it, but it obviously could be used without the elevator to collect the hay and convey it to a ricker platform or a stacker, just as the Kenaga rake does. The Perkins patent does not particularly describe projecting draft bars; but as draft bars are not new devices, and as their presence is evidently necessary and intended for the attachment of the thills and of the horses, the Perkins patent therefore sets forth the combination in a horse rake, having the horses independently attached at the ends of the rake, of projecting draft bars and projecting poles or their equivalents—thills—exactly as claimed in the Kenaga patent.

Int. 211. If you were to apply poles to the Perkins rake, what kind of poles would you select under the statement that the apparatus was to be drawn "by horses, one on either side of the fore end of the trough," and how would you apply them?

A. I should take poles which were adapted for one horse; such, for example, as those shown in the Currier patent. I should attach these poles probably to the sides of the frame of the machine by bolts or other fastenings, so that the horse could be placed beside the pole and be hitched to it forward. I should, of course, use a pole at each side of the machine, one for each horse.

355 Int. 212. With how much greater facility, if any, can the Kenaga rake be backed or turned than the Perkins apparatus?

A. Not with any, that I can see.

Int. 213. How, if at all, would it change the character, construction, or use of the combination of parts claimed in the complainant's patent if the Kenaga rake was placed in front of and attached to an elevating apparatus?

A. Not at all. The combination would still be there, and would operate in exactly the same way and accomplish the same purposes as before.

Cross-examination:

C. Int. 214. Please state what you understand to be the purposes of the apparatus sought to be described in the Defendants' Exhibit Perkins Patent.

A. There are two parts to the Perkins patent. The apparatus which we have been considering is described in the second part, and is for the purpose of gathering a cut crop—such as hay—from the ground, delivering it to an elevator, and raising it onto a wagon.

The apparatus described in the first part is for running a threshing-machine elevator.

C. Int. 215. Is the apparatus described in the first part of the Perkins patent set out in such clear and exact terms as to enable any one to construct and operate a machine therefrom?

(Objected to as immaterial.)

A. It is rather a suggestion than anything else; but the second part is quite clear.

C. Int. 216. Would it be possible to make a drawing of the apparatus described in the first part of the Perkins specification?

(Objected to as immaterial.)

356 A. I presume it would if the draughtsman had the apparatus before him. The description in the first part is hardly clear enough to make a complete drawing from.

C. Int. 217. The apparatus stated by you as described in the second part of the Perkins patent and illustrated in the drawing "Defendants' Exhibit Drawing of Perkins Patent" belongs to the class commonly designated in the art as "hay-loaders," does it not?

A. Yes; of hay loaders or stackers.

C. Int. 218. Are you familiar with this class of apparatus?

A. Somewhat.

C. Int. 219. State what opportunities you have had and in what way you have familiarized yourself with this class of apparatus.

A. I have had occasion once or twice to examine the various patents issued in the United States for such apparatus.

C. Int. 220. State when and for what purposes such examinations were made by you.

A. I had occasion a few days ago to examine quite a number of such patents and to testify regarding some of them in a suit by this same complainant against Rhea, in which suit the same counsel were present as in this suit. Just when I first had occasion to examine such patents I don't remember.

C. Int. 221. Did you ever see or operate a machine of this general class?

(Objected to for the reason that this ground has already been elaborately plowed over.)

A. I never operated a loader; don't know whether I ever saw one operating or not. I have seen a good many models of them,
357 and I have operated a good many gatherers. I have frequently seen elevators of different kinds in operation—elevating straw, ice, beer barrels, drain tiles, and other things.

C. Int. 222. Did you ever see or operate a hay-loader in which the cut hay was caught by rake teeth as the machine moved over the ground and carried from such teeth to a receptacle, such as a cart, by conveyor belts or a similar mechanism?

A. I have seen such elevators on grain-binders for taking the cut grain up over the driving wheel to the binding apparatus. I don't remember ever seeing such a machine elevating hay onto a wagon.

C. Int. 223. Does the Perkins drawing show a trough-like frame?

A. Yes, sir.

C. Int. 224. Is there any bottom to the frame shown in such drawing?

A. It was intended to have a bottom. The parts which show through should have been in dotted lines instead of full lines.

C. Int. 225. Please explain how the hay is received by the machine shown in the Perkins drawing and how it will be delivered thereby to the cart.

A. The hay is gathered up by the rake teeth and is caught by the teeth upon the cross-laths, carried up the inclined trough, and falls off the top of the trough where the belts pass around the pulleys. The hay, of course, is above the cross-laths in the trough.

C. Int. 226. Has the bottom of the trough any useful function when the conveyor belts are arranged to travel in the manner shown in the Perkins drawing?

(Objected to for the reason that the question assumes that "the trough-like frame" has a bottom.)

358 A. Unless the cross-laths are very close together a bottom is desirable to prevent hay from falling through.

C. Int. 227. If the laths or slats shown in the Perkins drawing are not very close together would the bottom of the frame then have any useful functions?

(Same objection as before.)

A. Yes; unless the cross-laths are very close together a bottom is desirable to prevent hay from falling through. The hay would rest on the bottom and be moved upward by the cross-laths and belts.

C. Int. 229. Would not the hay falling upon the inclined bottom be moved downward by the cross-slats and belts?

A. Certainly not. The slats are moved upwards by the belts and move the hay with it.

C. Int. 230. Is the lower end of the trough-like frame provided with a board or cross-piece extending from side to side of the frame?

A. It may be if desired. The drawing doesn't seem to show any except what is formed by the bottom.

C. Int. 231. If no end piece were provided would the operation be as you have described in your last four answers?

A. Exactly the same, except the slats would have to be close together to prevent the hay running through between them.

C. Int. 232. If the slats were at considerable distance apart so as to permit the hay to fall between them and the frame were not provided with an end board at its lower end extending between the sides at such points vertically or substantially so, would the bottom of such frame then have any useful functions?

359 (Objected to for the reason that the question assumes an impossible construction and has no reference to anything introduced by defendants.)

A. When the slats are at some distance apart the bottom of the

trough prevents some hay from falling between the slats to the ground, and it has a useful function to that extent. The presence or absence of an end board would have no effect unless it diverted the hay in some way.

C. Int. 233. If no end board were provided, the slats being at considerable distance apart, would not the hay fall from the lower open end of the frame onto the ground?

A. Some of it might; probably would.

C. Int. 234. If the slats were close together, as shown in the Perkins drawing, would it be necessary to have a bottom for the inclined frame?

A. No; I should think not.

C. Int. 235. If the rope marked "A" in the Perkins drawing were not crossed as there shown the inclined rake teeth might be placed at the extreme lower edge of the bottom of the trough, might they not, without in anywise impairing the operation of the machine?

A. In that case it would be necessary to have both sections of the belt of slats above the bottom and the trough, so that the hay would be elevated between the slats and the bottom, and in that case the placing of the teeth as stated would not impair the operation of the machine.

As shown in the drawing, the bottom of the trough, when there is one, is to be between the two lines of the slat belt.

C. Int. 236. Do you find in the specification of the Perkins
360 patent any statement indicating the location of the bottom of the trough, whether between the slats or below them?

A. The specification doesn't state.

C. Int. 237. If both sections of the slat belts were above the bottom of the trough, as indicated in your answer to C. Int. 235, and if the teeth were placed at the extreme lower edge of such bottom, would not such teeth then be made very much shorter than those shown in the Perkins drawing?

A. Yes; they would be made shorter.

C. Int. 238. I have placed upon the Perkins drawing the rake teeth, drawn in red ink and marked "B." I now ask you if the machine as thus modified, it being assumed also that the slat belts are above the bottom of the trough, as indicated in your answer to C. Int. 235, is not clearly within the language of the Perkins description.

A. Yes.

C. Int. 239. In the operation of the machine shown in the Perkins drawing the sole function of the rake teeth is to deliver the hay to the carrier slats, is it not?

A. Their main function is to gather the hay. The delivery of it to the carrier slats is merely a secondary consideration.

C. Int. 240. The purpose of the rake teeth in gathering the hay is simply to deliver it to the carrier slats, is it not?

A. Yes; to deliver it to the elevator. The same is true of the Kenaga and a good many of the other rakes before us, except that

in one the elevator goes along with the teeth and in the other it doesn't.

C. Int. 241. In the machine shown by the Perkins drawing or in machines working upon this principle the hay is carried from the top of the inclined teeth as fast as it accumulates thereon, is it not?

361

A. Yes.

C. Int. 242. In this class of machines cannot the rake teeth be made very short?

A. Sometimes.

C. Int. 243. Is it necessary that the teeth should be of such length as to accumulate the hay thereon?

A. No; but it would require no invention to make them of such length if it were desired to accumulate hay on them.

C. Int. 244. If the machine shown by the Perkins drawing were provided with rake teeth in the position indicated in red ink and by the letter B would such machine make a practically successful machine for the purpose of conveying hay to a stacker in the manner of the Kenaga rake?

A. With short teeth it would necessarily convey only small quantities at a time; otherwise it would be successful.

By agreement of counsel the further taking of testimony is adjourned until Monday, May 31, A. D. 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

MONDAY, *May* 31, *A. D.* 1886—ten o'clock a. m.

Met pursuant to adjournment.

Present as before.

C. Int. 245. Would a machine of the construction indicated in the last preceding question make as practically successful a machine for the purpose of conveying hay to a stacker as the old form of drag-rake or sweep?

A. It would operate as successfully, but would probably be slower, unless the elevator were left off, in which case, if the rake were of the same size as the old drag-rake, I think it would do just as much work.

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C. Int. 246. If the rake teeth were made simply of the relative lengths shown by the red lines on the Perkins drawing and with regard simply to their use in connection with the carrier slats would not such machine be inferior to the ordinary sweep or drag-rake for the purpose of conveying hay to a stacker?

A. For the reason that it would carry a smaller load it would be inferior, because it would take longer to harvest a given amount of hay. For this same reason the Kenaga rake is inferior to the ordinary rake, namely, that it cannot be worked so rapidly.

C. Int. 247. In order to render the machine shown in the Perkins drawing as practically and commercially successful for the purpose of conveying hay to a stacker as the old form of drag-rake or sweep

would it not be necessary to lengthen the teeth of the rake and to remove the inclined trough and conveyor slat and chains?

(Objected to for the reason that there is no standard for determining the length of the teeth, and for the further reason that the questions of "better or worse" and "proportions" are immaterial questions in patent law.)

A. Those changes would be desirable, certainly; and in order that the Perkins machine compete on the market with the old sweep or drag-rake they would certainly be necessary. The rake, however, would operate successfully without those changes.

C. Int. 248. If the draft bars of the Perkins drawing were attached to the fore end of the frame-work immediately behind the castor wheel and if the shafts were connected thereto in such man-
363 ner as to permit them to move freely in a lateral direction would not the machine, so modified, fall within the description of the Perkins patent?

A. I think it would, and in that case the horses would be alongside of the teeth, just as they are in the complainant's rake. In building a rake, however, from the Perkins description I should connect the shafts or poles so as to be immovable in a lateral direction, as that is the ordinary way of connecting those devices and has been for at least twenty years, to my certain knowledge.

C. Int. 249. The Perkins drawing shows laterally projecting bars, to which the thills are attached. Does the Perkins description mention any such bars?

A. The Perkins specification does not specifically mention such bars, but they were known in the prior art, being shown in some of the prior patents and admitted in the complainant's patent to be old, and therefore I put them in.

C. Int. 250. If poles were projected laterally from the fore end of the frame-work of the Perkins drawing and horses were hitched thereto by single-trees, would not such modified construction fall within the description of the Perkins patent?

A. I hardly think so. In such an arrangement the projecting devices would be called bars or beams and not poles. The patent says the horses are hitched in shafts or to poles, which implies that the poles take the place of the shafts and extend forward alongside of the horses.

C. Int. 251. If poles were attached to extend forwardly from the ends of the frame-work in the Perkins drawing, would it not be necessary that laterally projecting poles or bars should also be provided, to which the horses might be hitched?

364 A. Yes; or some substitute for them. The traces might be brought together behind and attached to the side of the frame, but that would be an unmechanical arrangement, and the ordinary mechanic or farmer would probably add the bars, especially as he would be familiar with such bars from his knowledge of the art.

C. Int. 252. If poles were attached to the front end of the frame-work of the Perkins drawing in such manner as to be freely movable

in a lateral direction, would not such construction fall within the terms of the Perkins description?

A. Yes; but the most natural way would be to make them immovable laterally, as that was the commonest way of using poles at that time.

C. Int. 253. If shafts such as are shown in Defendants' Exhibit Pennock Patent were attached to the fore end of the frame-work in the Perkins drawing, would not such construction fall within the terms of the Perkins description?

(Objected to, for the reason that the Pennock drawing does not show any shafts at all.)

A. No, sir. Perkins shafts are such that the horses are harnessed in them. There are no shafts in the Pennock patent in which horses can be harnessed.

C. Int. 254. If short poles were projected forward from the ends of the machine shown in the Perkins drawing and provided with means at their ends for hitching the single-trees of the horses thereto, would not such construction fall within the terms of the Perkins description?

A. Perkins' description is in language broad enough to cover such construction, but I think it should be construed in the light
365 of what was common at that time and held to mean the ordinary devices of the time and not some ingenious arrangement of subsequent times.

C. Int. 255. In this class of machines at the date of the Perkins patent was it not common to hitch the horses to the machine without providing any means whereby the machine could be backed?

A. Yes, sir; and so also it was common to provide such means.

WM. S. BATES.

JOSEPH DAIN, Jr., a witness produced on the part of defendants, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by L. L. BOND, Esq., as follows:

Int. 1. What is your name, age, residence, and occupation?

A. Joseph Dain, Jr.; age, 27 years; residence, Kansas City, Jackson county, Missouri, and occupation, traveling salesman.

Int. 2. Do you know the defendants in this cause; the kind of hay-rakes they are selling, and by whom the rakes complained of were manufactured? If so, state fully as to the points inquired after.

A. I do not. I know of them, but am not personally acquainted with them. I know they handle the rakes, and I know by whom the rakes complained of are manufactured. They were made by Trumbull, Reynolds & Allen, of Kansas City, Missouri.

Int. 3. Look at the patent now shown you, to wit, patent No. 288,314, to Joseph Dain, Jr., for horse hay-rakes, dated November 13, 1883, and marked "Defendants' Exhibit Dain Patent," and state whether or not you are the patentee mentioned in said patent,
366 and whether Trumbull, Reynolds & Allen have the right to use said patent in manufacturing rakes.

A. I am the patentee named in that patent, and Trumbull, Reynolds & Allen have the right to manufacture under the same.

Int. 4. Are you sufficiently familiar with patent specifications and drawings in horse-rakes to understand the rakes shown and described in such patents?

A. I am.

Int. 5. Have you read and do you understand the complainant's Kenaga patent?

A. I have and do.

Int. 6. Please explain the differences in construction and operation between the rake shown in the complainant's patent and the rake illustrated by the model "Complainant's Exhibit Defendants' Rake," and what practical differences, if any, there are between the two rakes in field use.

A. The body of the rakes are constructed substantially the same; also the devices to which the horses are hitched by their single-trees. In the Kenaga rake the tongues or poles to which the horses' breast straps are attached are made of one piece of timber, and at the rear ends are rigidly bolted to the outer side of the rake head. To the forward end of this stiff pole is connected a casting, projecting out in front of the horse, to which his breast strap is attached. In the model shown these tongues are made in two pieces, one hinged to the top cross-bar of the rake, about one-fourth of the distance from the end, and the other hinged to the draft bar inside of the head of the rake, and they are rigidly connected together at about one-fourth the distance from the front end of the first-mentioned
367 hinged bar. A ring or clevis is provided at the outer free end of this bar, to which the horse's breast strap may be attached. The difference in the operation is that in the Kenaga patent, the tongue being rigid and not allowed a free movement at its forward end, it necessarily rises and falls with the undulations of the ground with the points of the rake teeth and not with the horse.

In the model shown the tongues, having a free up-and-down movement, are allowed to move with the horse independent of the rake teeth, and as the rake teeth drop into a dead furrow or hollow the tongues do not pull down on the horses' necks, as in the Kenaga device, nor do they strike under his neck as the teeth pass over an obstruction. In the Kenaga rake the teeth continually run on the ground, either in raking or when going back after a load, while in the model shown, by the tongues being hinged, the rake teeth may be raised clear of the ground and not in any way affect the forward ends of the tongue. In the Kenaga device if the teeth were raised it would necessarily raise the ends of the tongues up against the horse's neck. The bars which form the tongue in the model shown, forming braces for each other and connected to the rake at a considerable distance apart at their rear ends, are much lighter and stronger than if made all in one piece, and have only one point of attachment to the rake head, as shown in the Kenaga patent.

Int. 7. State whether or not the loops or staples through which the braces of the hinged poles pass are so constructed that the braces may be drawn up tight against or in contact with the upper cross-

bar of the rake head; and, if not, state how they are made and for what purpose they are used.

368 A. In the model shown the staples are made so they could be drawn up against the upper bar; but in the rakes as manufactured they are not made so they can be drawn up; neither would it work properly if drawn up, as it would throw the ends of the tongues too high for attachment to the horses' breast strap; neither would we have the advantage of the raising of the points of the teeth, as the tongues would hold them down. The purpose of the staples is to hold the rake from tipping over backwards after it has been raised a sufficient distance to clear the teeth of the ground or obstructions and enable it to be balanced entirely on the two wheels.

Int. 8. Among dealers and manufacturers of agricultural implements, including horse-rakes, what would be understood by the expression "stiff poles secured permanently or removably to the ends of the rake head," or what is understood by the term "stiff poles"?

A. They would understand that it was one bar fastened to the side of the rake head in such manner that it would not move in any direction other than that secured in, but could be, if desired, detached from the rake entirely.

Int. 9. What experience, if any, have you had which would enable you to estimate or determine the raking capacity of the several varieties of this class of rakes, including those where the rake is drawn backwards by turning the horses around?

A. I have had considerable experience with this class of rakes, and have for over five years been in the field during a greater part of the harvest working and experimenting with rakes of this class.

Int. 10. What, in your judgment, is the difference in raking capacity between the sweep-rakes which were used by turning

369 the horses around to unload and to load after they have been drawn backwards and the Kenaga rake, and also between the Kenaga rake and the defendants' rake, if there is any difference in such capacity, understanding that all of the rakes are to be used under like circumstances?

A. The rakes being of the same size, I don't think there would be much difference in the capacity, if any, as the horses can be turned around and pull the rake from under its load and go back into the field after another load without any other stops and without any danger of the teeth running into the ground or obstructions as they are pulled backward, no matter how fast the horses might travel as the rake is pulled backward, while with the Kenaga or rakes of that class the horses must first back the rake from under its load, then turn the horses around with the rake before starting back after another load, and this same turning operation must again be repeated when it is desired to reload the rakes. The difference in the rake shown in the model and the Kenaga rake or the other rakes mentioned, when the horses are backed from under the loads, then by the driver moving back on the seat bar, lifts the points of the teeth clear of the ground, and by the tongues being hinged to the rake allow the teeth to raise sufficiently high to pass over any obstructions, and

thus to pull much lighter and not wear the points of the teeth, as would be the case in the Kenaga device, where the tongues are bolted rigid, or even in the rake that is pulled backward.

Int. 11. In the specification of the Kenaga patent it is stated that "an iron hook, *c*, extended outward from the end of the pole C will give a hitching point more directly in front of the horse." State whether or not such front iron *c* is applied to the rake poles by any one within your knowledge; and, if not, state how the horse is connected with the front end of the pole.

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A. They are not applied to any of the rakes or poles, to the best of my knowledge, and the horses are attached to the end of the bar, without the use of this iron, by a ring fastened directly to the end of the wooden bar, which is fastened to the horse's breast strap by means of another strap or chain.

Int. 12. Please look at Defendants' Exhibit Hudson Patent and state whether or not the poles there shown, under the proportion stated in the specification, would be of sufficient length to connect the horses with them by ring and strap, as mentioned in your last answer.

A. The specification states that the teeth are about eight feet long and the drawings show that these poles, marked C, are full as long as the teeth, while the attachment for the horse's single-tree is on the outer end of the axle at the rear end of the teeth; it would allow a horse being hitched by his breast-strap ring and extra strap, as spoken of in the last answer, as the ordinary thills in a buggy or wagon are only about six feet long from the single-tree to their forward ends.

Int. 13. Would they still be long enough if a section of chain was connected with the hitching rings or clevises, so as to permit the whiffletrees or single-trees to come in front of the wheels?

A. The wheel, as shown in the drawings, is considerably larger than the wheels used on rakes of this class, as with this length tooth the rake would not work well if raised higher than eight or ten inches off the ground at its rear end. In this case the whiffletree, pulling from the center of the wheel, would either have to be set out to one side far enough to miss the wheel or far enough ahead. In the first case the tongue would be long enough and make as good a hitch as shown in the Kenaga rake; in the latter case the tongue would necessarily have to be made as much longer as half the size of the wheel, which would be about ten inches. With either of these changes the tongue would be long enough for the ordinary horse.

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Int. 14. State, if you know, the diameter of the wheels used by the complainant and by the defendants, as their rakes are manufactured.

A. In the complainant's rake they use a wheel about ten or twelve inches. The wheels in the defendants' rake are from twenty to twenty-two inches.

Cross-examination by G. P. FISHER:

C. Int. 15. Are you in the employ of Messrs. Trumbull, Reynolds & Allen?

A. Part of my time.

C. Int. 16. By whom are you employed when not employed by such firm?

A. No one; I am working for myself.

C. Int. 17. Do you receive a royalty from Messrs. Trumbull, Reynolds & Allen under your patent No. 288,314?

A. I do not.

C. Int. 18. Is there any understanding or expectation upon your part that a royalty will be paid you if a rake made in accordance with your said patent should escape infringement of the Kenaga patent or in event the Kenaga patent should be held invalid by the courts?

A. I have no understanding with any one that I will receive any royalty, whether the Kenaga patent be sustained or not.

372 C. Int. 19. What understanding, if any, exists between you and Messrs. Trumbull, Reynolds & Allen or the T., R. & A. Manufacturing Company with regard to the manufacture of rakes under your patent?

A. The understanding is that they may make all the rakes they choose without paying royalty.

C. Int. 20. Have you ever licensed any one other than Trumbull, Reynolds & Allen under your before-mentioned patent?

A. I have not.

C. Int. 21. In your judgment, cannot a successfully operating rake be made in accordance with the Kenaga patent by one skilled in that particular art?

A. One serious objection might be raised to the rakes, as the points of the teeth cannot be gotten off the ground. Aside from this, the rake would work.

C. Int. 22. This objection which you have noted was common to all drag or side-draft rakes at the date of the Kenaga patent, was it not?

A. This was common to all rakes of this class, with the exception of the Hudson rake, who hitched the horses at the side and provided that a bar might be used, whereby the points of the teeth could be lifted over obstructions or clear of the ground.

C. Int. 23. Please refer to the Hudson patent and specify the bars which you mean in your last answer.

(Witness refers to patent No. 94889.)

A. The bars C are arranged so that they may be adjusted high or low, at their points, to any desired height.

C. Int. 24. For what purpose will such adjustment be made?

A. To make it convenient for the boy sitting on the horse to reach.

373 C. Int. 25. About how high, with respect to the back of the horse, would you say these bars should be placed, in accordance with the Hudson patent?

A. I should say about half way up its side.

C. Int. 26. About how far forward, with respect to the body of the horse, do you think it would be necessary or desirable to extend the ends of these bars in order to accomplish their purpose in the patented structure?

A. It would be necessary and desirable that this bar C in the Hudson patent should extend far enough forward to pass the horse's shoulder, in order that the end of the bar C, in turning the rake, would not in any way injure or run into his side.

C. Int. 27. If, therefore, as one skilled in the art, you were to build a machine in accordance with the Hudson patent, and to accomplish the purposes of this patent, you would extend the bar C about as far forward as the front of the horse's shoulder, would you not?

A. I would extend it at least this far forward, but, as the specifications speak of the teeth being about eight feet long, the drawings would show the bars C to be even longer than to pass the horse's shoulder.

C. Int. 28. Do I understand you to mean that there is a distance of more than eight feet between the forward ends of the bar C, as shown in Fig. 2 of the Hudson drawing, and a vertical line bisecting said bars from the links on the ends of the axle?

A. It would show in the drawings of Figs. 1 and 2 both that whatever distance the teeth projected forward of the axle the bars C in figure 1 and figure 2 would extend the same distance, and, as the teeth extend some back of the center of the axle to which
374 the links are attached, the distance between the link and the forward end of the bar C would not be quite eight feet.

C. Int. 29. Having respect simply to the purposes of the Hudson patent, would not a skilled mechanic, in your judgment, in constructing a machine in accordance therewith, make the bars C simply long enough to be conveniently grasped by the riders of the horses, particularly in view of the fact that no exact dimensions for such bars are prescribed?

A. As the dimensions are not spoken of, only taken in relation to the dimensions given for the teeth and in connection with the drawings, he would undoubtedly make the bar C extend to the points of the teeth.

C. Int. 30. You think, therefore, he would be guided in making these bars rather by the length prescribed for the teeth than by the purpose which the bars are to accomplish, do you?

A. If he was to make the teeth longer or shorter he would undoubtedly know that that would not make any difference to the length of the bars C, but as the specifications say about eight feet and the bars C show in the drawings to extend as far forward as the points of the teeth, if he shortened or lengthened the teeth he would not in any way change the bar.

C. Int. 31. You think, therefore, do you not, that he would be guided in constructing these bars by the office which they were to perform, and not by the length prescribed for the teeth, inasmuch as it makes no difference whether the bars be longer or shorter than the teeth?

A. The teeth would be a material guide in constructing these bars C, as they give, by referring to the specifications and drawings, the distance that their points should extend forward of the
375 axle; but if he made the teeth longer than eight feet he would know that that had no effect on the length of the bar, neither would it if he made the teeth shorter than eight feet.

C. Int. 32. By thus adopting eight feet as a length for the bars and retaining such length, whether the teeth be lengthened or shortened, he would be guided by the office which these bars were to perform, would he not?

A. He would not know just what length it required these bars C to be before trying the device, unless he was guided by the specifications and drawings.

C. Int. 33. Referring to the purposes of the Hudson invention, in what way do you understand that the horses would be attached thereto?

A. The horses would be independently hitched at the side of the rake by single-trees to the loops or links on the end of the axle outside of the wheels.

C. Int. 34. Would not some provision be made in order to prevent the single-tree interfering with the wheel of the machine?

A. Unless the single-tree was attached forward of the wheel by means of chain or other suitable device, it would be necessary to extend the axles out past the wheel far enough to allow the single-tree to be attached close up to the axle, but clear of the wheel, as shown in the Carrothers patent, the Currier patent, and the Roney patent.

By agreement of counsel the further taking of testimony is adjourned until Friday, May 21, A. D. 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

376 FRIDAY, *May* 21, *A. D.* 1886.

Met pursuant to adjournment.

Present as before.

C. Int. 35. Having respect to the objects of the Hudson invention, the ordinary purchaser of the Hudson machine would attach the horses thereto by single-trees and chains, would he not?

A. Yes.

C. Int. 36. Assuming the horses to be attached by single-trees and chains to the ends of the axle in the Hudson machine, and assuming the dimensions of the bars C and of the rake teeth to be as you have stated, would it be practical or possible to attach the horses by their breast straps to such bars?

A. Assuming the dimensions as stated in the specification and drawings, it would be possible to hitch the average horse to the bars C by their breast straps, especially if the irons shown, marked *c*, on the ends of the poles C of the Kenaga patent, which are not claimed therein nor are they used on their machines, were used on the ends of these bars C of the Hudson patent.

C. Int. 37. About what would you say would be the distance, in a machine built in accordance with the Hudson patent, between the forward ends of the bars C and the vertical line bisecting said bars from the front edge of the wheels?

A. I would suppose the distance from the forward end of the bar C back to the wheel to be about five feet, as the wheels shown in the Hudson patent are much larger than used in the Kenaga patent or in the manufacture of the Kenaga rakes.

C. Int. 38. Assuming the distance from the front ends of the bars C to the front of the wheels in the Hudson machine to be
377 five feet, and assuming the horses to be connected by single-trees and chains to the ends of the axle, please state how far, with respect to the body of the horse, the bars C would extend.

A. They would extend at least as far forward as the horse's breast if the single-tree was hitched close to the front edge of the wheel.

C. Int. 39. Would it be practical to connect the single-tree so that it should come very close to the wheel?

A. Yes; so long as it did not touch the wheel.

C. Int. 40. Would it be practical, in your judgment, to connect the horses by chains and single-trees to the Hudson machine, and to connect them also by breast straps to the bars C, if the front of these bars were of no greater distance than five feet from the front of the wheels?

A. It would be.

C. Int. 41. Would it not be necessary to extend these bars in some manner, either forwardly or laterally?

A. The horses could be practicably hitched to this rake, in the manner spoken of in the preceding question, without the use of any other device or extensions.

C. Int. 42. What do you mean by the expression "practicably hitched," in your last answer?

A. I mean that the horses could be hitched to the rake by any one who knew how to hitch up a horse, so that the rake would operate.

C. Int. 43. Operate for what purpose and in what manner?

A. For the purpose of raking hay from the field to a stack or ricker.

C. Int. 44. Assuming the horses to be attached to the Hud-
378 son machine, in the manner last referred to by you, please define how the load of hay could be deposited upon a ricker platform and the machine backed therefrom.

A. By the single-trees being held off the horse's heels by the use of hip straps, such as are used in plowing, harrowing, etc. The horse would be allowed to move back some distance and thus tighten his breast straps, which, being attached to a ring or otherwise at the forward end of the bar C, could back the rake from beneath its load.

C. Int. 45. In backing the horses when so attached to the Hudson machine would there not be danger of their legs striking the wheels before the breast straps became taut?

A. There would be, unless the horse would back straight; so also there would be in the Kenaga device.

C. Int. 46. Do you think it would be practical to connect the horses by single-trees and chains to the links on the ends of the axles in the Hudson machine, and by breast straps to the poles C, and under the ordinary conditions of field operations to satisfactorily work such machine, so that the horses could back the rake from beneath the load?

A. There might be some objection, as the horse in backing might sometimes strike the wheel; but by extending the axles a little further out from the wheels it would satisfactorily operate.

C. Int. 47. Is it not your judgment that without so extending the axle a Hudson machine, when the horses were connected thereto in the manner before defined, would, under ordinary conditions of field operations, be impracticable for general use?

A. There would be objections to it, as in backing, if the
379 horses were to swing their hind feet in towards the rake, they would strike against the wheels.

C. Int. 48. In your judgment, would not such objections be fatal to the introduction of such machines to the trade?

A. It would not entirely destroy the usefulness of the rake.

C. Int. 49. (Question repeated.)

A. No, sir; it would not.

C. Int. 50. In your judgment, would it be any material advantage in the operation of the Hudson machine to connect the horses by breast straps to the poles C?

A. I consider it would.

C. Int. 52. Would such be your judgment if the horses were also connected by chains and single-trees to links on the ends of the axle and if the poles C did not extend beyond the horses' breasts?

A. It would be.

C. Int. 53. How do you reconcile your last answer with your answer to C. Int. 47?

A. I consider it would be a practical machine, but would, as I have stated before, without any modifications, have the objection of the horses' heels striking against the wheels if they should swing in next to the rake in backing up.

C. Int. 54. Would there not be constant danger of the horses swinging against the wheels of the machine under ordinary conditions of field operation when backing the machine?

A. There would be, unless the horses were carefully handled.

C. Int. 55. If the ordinary field hands were employed in
380 handling the horses would not the danger of the horses backing against the wheels be a very serious objection to the use of the Hudson machine in the manner suggested by you?

A. I don't consider it would be very serious, as, in case the horse did touch the wheel merely in backing, it would not necessarily injure him, as the wheels would be revolving backward as he moved backward.

C. Int. 56. Would it not, in your judgment, be a material improvement upon the Hudson machine to provide the same with draft bars extending a distance beyond the wheels or to extend the axles at a sufficient distance beyond the wheels to prevent the horses

striking the wheels in the backing operation, assuming the horses to be connected by breast straps to the poles C in the manner described by you?

A. I consider it would be an improvement to extend the connection for the horse by a single-tree far enough past the wheel to admit of his backing without coming in contact with the wheel, as shown in the Bean patent, Fig. 4 of the drawings.

C. Int. 57. Would an extension of the axle of the Hudson patent in the manner shown in the Bean patent and to the extent there shown be sufficient for such purpose?

A. As the teeth, in rakes of this class, are placed about twelve inches apart, and taken in connection with the drawings, the extension of the axle, Fig. 4, Bean patent, would be something over twelve inches, and would thus give sufficient room. This would be from the outer end of the hub of the wheel, which, in the drawing, extends some further out than the rim of said wheel.

C. Int. 58. In the Bean patent it is stated that "the gud-
381 geons B B^1 project some distance beyond the hubs of the ground wheels so as to afford room for attachment of the ropes or chains D D^1, to whose ends are secured the single-trees d d^1." How far, in your judgment, would it be necessary to extend these gudgeons in order to accomplish their function in the Bean patent?

A. It would not be necessary to extend them more than sufficiently far to insure the ropes or chains rubbing against the rim of the wheel as the horses would vary in going over the ground.

C. Int. 59. Would not the ordinary mechanic in constructing the Bean machine extend the gudgeons B B^1 simply a sufficient distance to permit them to accomplish the function stated for them in the patent?

A. As I stated in the last answer, and the mechanic not taking into consideration Fig. 4 of the drawings, he would only extend them to admit of the vibrations of the rope or chain or of its being drawn at different angles from the wheel without touching its rim.

C. Int. 60. How far should the ends of the axles of the Hudson machine be extended in order to avoid the danger of the horses backing upon the wheels, assuming that the horses were connected by their breast straps to the poles C of the Hudson patent?

A. As they are already extended a short distance outside the wheels, it would only be necessary for them to be extended about twelve inches in order to insure the horses' heels not touching them.

C. Int. 61. If the horses were attached by single-trees to the ends of extensions of the axle of the Hudson machine of the length you have just mentioned, how far would the center of the whiffletree be from the projecting poles C of the patent?

382 A. I would judge it would be about twenty-two inches.

C. Int. 62. Assuming the horses to be connected to the Hudson machine by single-trees and chains to the ends of the axles and by breast straps to the projecting poles or arms C, please describe the operation of backing the horses.

A. As the breast straps would be connected to the forward ends

of the poles C and the horses were moved backwards, and as this form of rake backs very easily, it would necessarily back.

C. Int. 63. You will observe that the poles or arms C of the Hudson patent are connected to the tops of the uprights. In the backing operation would not the backward movement of these poles elevate the rake teeth to a considerable extent and hold them elevated so long as the backing was continued?

A. First, in backing the Hudson rake with the horses hitched to the forward end of the bars C by their breast straps the fact of their being connected to upright bars at their rear ends would not have a tendency to raise the points of the teeth off the ground, as the line of draft would be directly communicated from the forward point of this bar C to the axle, or resistance, substantially the same as the draft would be applied to the Kenaga device; second, as the hay would be on the points of the teeth, it could not raise until backed out from under its load, even if it might have this tendency.

C. Int. 64. In your judgment, therefore, it would make no difference, so far as the elevation of the teeth are concerned, whether the rear ends of the poles C in the Hudson patent are connected to the tops of the uprights or to the rake heads?

383 A. It would make no difference, in my judgment, how high or low the rear ends of these bars C might be connected to the head of the rake, so long as their forward ends were free for the attachment of the horse's breast strap at a convenient height.

C. Int. 65. Assuming the ends of the axle of the Hudson machine to be extended in the manner referred to by you, and assuming the horses to be attached to such extensions and by breast straps to the projecting arms C, would it not be necessary to extend the forward ends of these arms in an outward direction from the rake head?

A. It would not be necessary any more than where a horse is attached to a bus or wagon by means of chains or straps directly to the end of the pole without the use of a neck yoke or extension outwardly.

C. Int. 66. About how long is the ordinary wagon or bus pole?

A. Measuring from the single-tree forward to the end of the pole, they would measure from seven to eight feet.

C. Int. 67. Assuming the arms C in the Hudson machine as extending about five feet in front of the wheels, and assuming the horses to be attached to the links on the ends of the axles by chains and single-trees, would it not be necessary to extend the arms C in an outward direction in order to enable the horse to back the machine?

A. As the bars C would be sufficiently long to come as far forward as the horse's breast they could be attached by means of a short strap or chain to his breast strap or collar.

C. Int. 68. Would not the horses in so backing as to avoid the wheels wrench or break off the bars?

384 A. They would be no more liable to break or wrench by a side or outward strain any more than if they had outward extensions.

C. Int. 69. If the bars C of the Hudson machine extended no

further forward than the horses' breasts and were connected, as you suggest, by short breast straps to the collars would not the horses in a forward movement tend to thrust the points of the rake teeth into the ground?

A. They would not, as they would be or could be, by the adjustment shown in the drawings, on about a level with the horses' breasts and would have no effect whatever on the points of the teeth.

C. Int. 70. In operating the Hudson machine the horses are to have independent riders, are they not?

A. Yes, sir.

C. Int. 71. The legs of the riders would come between the bodies of the horses and the projecting arms, would they not?

A. They would.

C. Int. 72. In reversing the direction of travel of the Hudson machine the riders would wheel the horses in an outward direction, would they not?

A. Yes.

C. Int. 73. Having consideration for the purposes of the Hudson invention, do you find in the Hudson patent any suggestion which would incline a skilled mechanic when constructing a machine in accordance with said patent to provide the projecting bars with any means whereby breast straps may be attached thereto?

A. I do not.

C. Int. 74. From an examination of the Kenaga patent
385 what kind of pole do you find to be there defined as necessary in constructing a rake in accordance with Kenaga's invention?

A. If poles are used they are described in the Kenaga patent as being stiff and secured permanently or removably to the ends of the rake head.

C. Int. 75. What do you understand to be the object in the constructions defined in the Kenaga patent of attaching the poles at the end of the rake head?

A. In order that the horses may be hitched by the side and close to them, similar to that shown in the Hudson patent.

C. Int. 76. Do you mean to infer by this last answer that the purposes of the poles in the two patents are the same?

A. By attaching the horse's breast strap to the end of the poles in both the Kenaga and Hudson patents their purposes would be the same.

C. Int. 77. Considering the specifications of these two patents, do you find the purposes of the poles as defined therein to be the same?

A. I do not.

C. Int. 78. Would it make any material difference in the operation of the poles in the Kenaga patent if the rear ends of the poles were attached at some distance, say from one to three feet, from the ends of the rake head, the outer ends of such poles extended in a forward and outward direction, as at present?

A. They would necessarily have to be made longer and stronger, as the backing of the rake would have a greater tendency to break them. Aside from this, if attached in the same manner as shown

in the Kenaga device, it would make no material difference, only that as the rear end is connected close to the teeth and being
386 in the body of the rake it would not allow it to take its load freely, and the hay would wedge between the tongue and teeth and would not of its own accord be unloaded when backing.

C. Int. 79. In your judgment, however, and having reference to the purposes of the Kenaga invention, would not poles, extending from a slight distance, say one to three feet, from the ends of the rake head to a position about the same as the front ends of the poles in the Kenaga patent be the mere mechanical equivalents of poles connected directly at the ends of the rake head, as in such patent?

A. In making this change and attaching the tongue rigidly to the rake head, as stated in the Kenaga patent, it would merely be the equivalent of the device shown to rigidly attach it at a point a short distance from the end of the rake or the distances spoken of in the question, but would not in this manner operate satisfactorily without materially lessening the capacity of the rake and carrying at all times a considerable amount of hay under each tongue.

C. Int. 80. Referring to defendants' model, are not the tongues formed of sufficient thickness to render them stiff, and is such not also the case with defendants' rakes?

A. The bars or tongues are made practicably stiff from one end to the other, but are not connected rigidly to the rake; therefore neither in their operation or at any other time are they a stiff tongue, only in one direction, that being sideways.

C. Int. 81. In the operation of backing a rake made in accordance with the Kenaga patent or in accordance with the defendants' model do the poles yield in a lateral direction?

387 A. No; they only yield what little the timber will spring.

C. Int. 82. It is necessary, is it not, in both constructions that the poles should be stiff against lateral movement both in the backing and wheeling or turning operations?

A. It would be necessary that they should not have any lateral play or give, or at least but little. The same would apply in the Hudson patent if breast straps were attached to the forward ends of the poles C, which have no lateral give.

C. Int. 83. As regards lateral movement, are not the rear ends of the poles in the defendants' model rigidly connected to the rake?

A. Laterally they are rigid; even more so by means of their braces than the Kenaga or Hudson device.

C. Int. 84. Would it make any material difference if the tongues and brace bars in the defendants' model were brought nearer together at their rear ends, say one-half or one-third their present distance?

A. It would make them very much weaker, as their points of connection to the rake would be so close together it would necessitate their being made very much stronger, while as at present they are made much lighter at their rear ends than at their points or forward ends, and still are sufficiently strong.

C. Int. 85. Would it make any difference in the principle of op-

eration whether the rear ends of the tongues and brace bars be close together or far apart?

A. As the tongues or bars are pivoted to the rake head they must necessarily, by means of their braces, be connected at a considerable distance apart or they would not resist the lateral strain.

388 C. Int. 86. The object, therefore, in connecting at a distance apart is simply to make them rigid in a lateral direction, is it not? And is it not simply necessary to connect them at a slight distance apart?

A. As the brace to the tongue extends back to the rear cross-bar of the rake, and the bar being connected a considerable distance above and in front of this cross-bar, there would necessarily have to be a considerable distance between their points of attachment in order to make them laterally stiff enough.

C. Int. 87. Referring to the Dain patent, No. 288,314, I will ask you whether it would be a departure in principle of construction from the form there shown if the brace bars and tongues were but half their distance apart at their rear ends.

A. If the rake was constructed so that the upper cross-bar, to which these bars are hinged in the Dain patent, was sufficiently strengthened at the points nearer together to where you expected to pivot the bars, the same as they are supported and strengthened as shown in the Dain patent, the principle would be the same.

C. Int. 88. Referring to the Dain patent and to the defendants' model, is it a matter of material difference whether the braces be upon the outside or inside of the poles?

A. The difference would be that the poles would be easier broken by lateral strain at its point of connection with the brace if it were upon the inside.

C. Int. 89. So long, however, as the braces were sufficiently strong to guard against lateral movement there would not be any difference in principle or operation, would there?

A. No, sir.

389 C. Int. 90. Please describe the mode of operation of backing a rake made in accordance with defendants' model after the rake teeth have passed between the prongs of the stacker platform.

A. The operation of backing from beneath the load or away from the stacker would be the same as in backing the rake at any other time, which would be accomplished by means of the horses' breast straps being attached to the forward ends, the same as it would be accomplished by attaching the breast straps to the forward ends of the bars C of the Hudson patent.

C. Int. 91. Describe the mode of operation of a rake built in accordance with defendants' model when such rake is being turned to go from the stacker back into the field, pointing out particularly the action of the poles upon each of the horses at all times.

A. In turning the rake the driver or rider, as the case may be, would hold one horse back and let the other one move forward, and by doing this the rake is turned as may be desired.

C. Int. 92. Are the horses not connected by hitch straps to the

outer portion of the poles in the operation of machines made in accordance with defendants' model?

A. They are not.

C. Int. 93. In what direction is the strain thrown upon the poles or either of them in the operation of turning a rake like defendants' model?

A. The turning of the rake is not done nor can it be practicably done by the use of the tongues, as the rake teeth being of such a length and so many of them that the friction upon the ground at their points would be so great that it would be very difficult, if at all accomplished, by the ends of these tongues; but as one horse
390 moves forward and the other one is held back, the horse that is moving forward will turn the rake teeth upon the ground to any desired position by means of his attachment to the singletree, as is shown in the Bean and Hudson patents, independent of these tongues.

C. Int. 94. Please describe the operation of a rake made in accordance with the Kenaga patent when in the act of backing the rake and when its teeth are between the teeth of the ricker platform.

A. The operation of backing the Kenaga rake from between or beneath the teeth of the ricker platform would be accomplished the same as at any other time, which would be by attaching the horses, by their breast straps, to the forward ends of the poles C, the same as it would be in the Hudson patent if the same harness attachments were used.

C. Int. 95. Would it not also be necessary to provide some means of attaching the breast straps to the poles of the Hudson machine?

A. It would be necessary to bore a hole through the end of the bar or put in a staple, to which the breast strap may be attached.

C. Int. 96. In the operation of backing a rake made in accordance with defendants' model and a rake made in accordance with the Kenaga patent, do not the poles perform the same function so far as enabling the horse to back the rake from beneath the load?

A. As the tongues are hinged at their rear ends to the rake in the defendants' model, when the horse is backing the tongues will conform freely to the height of the horse, and to the height of whatever his attachments may be, and not draw up or down on his neck, as would be the case in the Kenaga or Hudson device.

391 C. Int. 97. Do not the poles in a rake made in accordance with defendants' model accomplish all the functions of the poles in the Kenaga patent in the operation of backing a rake?

A. With the above-mentioned differences, as in the last answer, they do.

C. Int. 98. Do you regard the use of thills as a substitute equivalent for poles in the construction defined in the Kenaga patent?

A. I think it would require a little invention to substitute thills for the poles, as it would require the rake to be constructed differently at its ends in order to find place for attachment; and these differences are not mentioned in the Kenaga patent, but by referring

to the J. & W. Carrothers patent it could be seen how this might be accomplished.

C. Int. 99. What advantages has a rake made in accordance with defendants' model over the old form of drag-rake, wherein the horses are connected at the ends of the axles and are reversed in the operation of drawing the rake from beneath its load?

A. In constructing a drag-rake they have for years been used with a projecting bar outside of the head of the rake a sufficient distance to allow the horses to be hitched directly back to the bar by a single-tree and still be outside of the wheel. The wheels very often, however, were placed beneath or in the body of the rake, and overcome the objections of having them on the ends of the rake, similar to those shown in defendants' rake. The advantages are, in constructing a rake like defendants' model over the old form of drag-rakes just mentioned, that *in* defendants' rake, by means of the hinged tongues, admits of provision being made whereby
392 the rake teeth may be elevated clear of the ground and obstructions, and not in any way affect the position or working of the tongues, and not be allowed to tip too far backward. By this construction of tongue they will not in any way interfere with the rake teeth passing over rough and uneven ground while raking, nor destroy the free movements of the points of the teeth, which would be the case if a stiff tongue were used, as in passing over obstructions the teeth could not be raised sufficiently high to clear without raising this stiff tongue up under the horse's neck at its outward extension or casting at *c*. Then, if the teeth would drop into a dead furrow or hollow or the horse would be passing over a knoll the teeth would be raised clear of the ground or pull down on the horse's neck.

C. Int. 100. Have you enumerated all of the advantages possessed by a rake made like defendants' model over the old style of drag-rake?

A. In the defendants' rake by the use of these hinged bars or tongues it enables the horses to back the rake when desired or when unloading, while with the drag-rake the horses are turned around and pull the rake backward, and if it were not possible to raise the points of the teeth off of the ground, as provided in the defendants' model, it would be better that the rake in either case should be drawn backward in going back into the field after another load. As rakes of this class are only used on large fields, they usually have to travel a considerable distance to get another load, while if the points of the teeth were always on the ground, as in a common drag-rake, if they were always moved forward, it would be necessary that they should be taken back very slow or at about the same speed as when raking, while in the defendants' rake,
393 when backed from under its load, the driver moves back on the seat bar and his weight elevates the points of the teeth clear of the ground, and he may drive back into the field as fast as he chooses without any danger of the teeth running into the ground. Aside from this, and the fact that one man can handle the horses

instead of two boys, there would not be any material difference in the raking capacity of the two rakes, if both of the same dimensions.

C. Int. 101. Do I understand you to mean that if the old drag-rake, such as you have described, with draft bars projecting from the ends thereof, should be provided with poles, after the manner of the Kenaga patent, that such old form of rake would not be improved thereby?

A. Inasmuch as it is provided so one man can handle the horses, instead of two boys, this much of it would be some advantage, but would not add much, if any, to the capacity, as it could not go back into the field as fast as the old form of drag-rake, as the teeth would necessarily run into obstructions, and it also requires longer to back from beneath the load a sufficient distance for the horses to turn without cramping the hay and then turn clear around, which operation would have to be, as far as turning is concerned, repeated when wishing to gather another load or come back toward the stacker, while with the common drag-rake the horses are turned straight around and go back into the field without any other stops.

C. Int. 102. In the operation of the old form of drag-rake it was necessary, was it not, to reverse the horses and draw back the rake when a serious obstruction was presented to the points of the teeth?

A. This would be the case. So also it would be with either form if the obstruction was a very serious one and the teeth would
394 run into it any considerable distance, which would be the case if driving very fast. This is not common with any of the rakes, as the ground is usually level enough, so that the teeth will, by their being slanted from the under side, pass over most of the obstructions, but in case the obstruction was not serious or the teeth did not become very tight the rake having the stiff tongues could back up, then turn, and pass the obstruction.

C. Int. 103. Is it not, therefore, a material advantage in having the rake provided with means whereby it could be backed to avoid obstructions?

A. It is an advantage in that case.

C. Int. 104. Will you please examine the circular now handed you and marked "Complainant's Exhibit Kirk Exhibit D," and state, if you know, whether the statements upon the page "A" and between the points marked with a cross are true as regards those referred to?

A. With reference to the rake shown in the cut down at the right-hand lower corner of the wood cut, on the said circular marked "Kirk Exhibit D," the reading on page marked "A," between the crosses on said page of the circular, are true.

C. Int. 105. In the rake to which such statements refer, state, if you know, whether the projecting poles are rigidly attached to the rake heads, so as to be incapable of movement in an independent vertical direction or connected thereto by hinges permitting vertical movement with respect to the rake bottom.

A. They were connected to the rake head by hinges and did have an independent vertical movement with reference to the rake body.

C. Int. 106. With the old form of drag-rake, to which you
395 have referred and in which two riders were employed, was there not great difficulty experienced in getting the rake load onto the ricker?

A. There was considerable difficulty when the boys first started to work the rake until they had learned how to handle the horses; so also there would be with one person handling both horses; but in either case these objections would soon be overcome, especially in the case where the tongues were used.

C. Int. 107. With independent riders was there not constant danger in the old form of drag-rake of breaking the teeth of the rake or the platform when the riders turned the horses to withdraw the rake or when the riders advanced the rake into the platform?

A. There is considerable danger of this, and it often happens; more especially, however, when first starting.

C. Int. 108. Do you not have constant difficulty when selling rakes to the trade or the farmers who have had no experience with drag-rakes having projecting poles at their ends in convincing them that it is practicable to hitch two horses at the ends of the rakes and successfully control them by a single driver?

A. At first mentioning it they doubt that it could be done, but after explaining it to them, and knowing that the common drag-rakes were guided by one horse moving faster than the other, then they understand how it could operate. I mean where each horse has a separate driver, as is the case with the drag-rake.

C. Int. 109. Is it not a fact that since the introduction of the first rakes having projecting poles at their ends and draft bars that such forms of rakes have very largely superseded the old form of drag-rake?

A. It is.

396 C. Int. 110. As the owner of the Dain patent No. 288,314, is it not to your interest to have the Kenaga patent declared invalid by the courts?

A. I have no control over the Dain patent; personally it is of no interest to me.

C. Int. 111. Who owns the entire interest in such patent?

A. Trumbull, Reynolds & Allen own the exclusive right to manufacture and sell all the rakes they choose under said patent.

C. Int. 112. Have you been paid the full consideration for which you transferred the said exclusive right to Trumbull, Reynolds & Allen?

A. I have.

C. Int. 113. Has not the sale by Trumbull, Reynolds & Allen of hay-rakes like defendants' model largely increased their sale of their stackers?

(Objected to, for the reason that sale of stackers has nothing to do with this suit.)

A. It would be hard for me to tell, as I do not keep the books or have anything to do with them.

C. Int. 114. Do you not believe such to be the fact?

(Same objection.)

A. So far as the sale of the stacker is concerned, to the best of my knowledge, we did not sell more than a hundred more last year than the year before. The rake shown in the model was only made last year.

C. Int. 115. Do you not receive a royalty upon the stackers manufactured by Trumbull, Reynolds & Allen, and is it not therefore to your interest to increase the sales of such stackers?

A. I do receive a royalty on the stackers only. The rake does not make me any money one way or the other. These stackers
397 are used with all forms of rake, including complainant's common drag-rakes and rakes that the farmers themselves build.

C. Int. 116. State, if you know, what business relations exist between the defendants herein and the firm of Trumbull, Reynolds & Allen or the T., R. & A. Manufacturing Company.

A. No other relations that I am aware of than that the defendants are the agents of said firm or company for Peoria, Illinois, and vicinity.

C. Int. 117. At whose request and at whose expense are you in attendance here as a witness?

A. At the request of Messrs. West & Bond and at the expense of T., R. & A. Manufacturing Company of Kansas City, Missouri.

C. Int. 118. Is the T., R. & A. Manufacturing Company bearing the expense of this litigation?

A. I think they are. That is my understanding.

Redirect:

R. D. 119. You spoke of the hay being liable to wedge under the arms or tongues of the Kenaga rake if their attachment should be made over in the body of the rake. Is there the same liability in the defendants' rake; and, if not, why not?

A. There is not, as the attachment of the tongues to the rake are about fourteen inches above the teeth, and, the tongue being hinged, when the horse would back their ends would be raised slightly and thus loosen the load.

R. D. 120. In C. Int. 99 you stated that hitching bars projecting beyond the wheels at the ends of a rake were old. State whether or not they were old in the form shown in the complainant's Kenaga patent.

(Question objected to as not properly relating to any matters brought out on cross-examination.)

398 A. They were.

R. D. 121. State whether or not the trade in hay-stackers has increased beyond what it would naturally increase or ought to increase under the commercial efforts made to keep them on the market and sell them.

A. I don't think it has.

Recross:

R. C. 122. Is it not a fact that objection has been made to rakes like defendants' model because the extension of the projecting poles across the teeth interfered with the capacity of the rake?

A. Not to my knowledge by any one using them, but may have been made by parties interested in other rakes.

R. C. 123. Has not such objection been reported to you by your agents?

A. Not on the rake made in accordance with the defendants' model, but I believe such objections were made to the rakes made like the ones shown in "Complainant's Exhibit Kirk Exhibit D," but don't remember by whom. We have obviated this objection by raising the tongues at their rear ends about two inches higher.

JOSEPH DAIN, JR.

By agreement of counsel the further taking of testimony is adjourned until Tuesday, May 25, 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

399 TUESDAY, *May* 25, 1886—ten o'clock a. m.

Met pursuant to adjournment.

Present as before.

By agreement of counsel the further taking of testimony is adjourned until Wednesday, May 26, A. D. 1886, at ten o'clock a. m.

ALBERT H. ADAMS,
Notary Public.

WEDNESDAY, *May* 26, *A. D.* 1886—ten o'clock a. m.

Met pursuant to adjournment.

Present as before.

NOTE.—Under this date the cross-examination of the witness, W. S. Bates, was taken up and proceeded with, as will be seen by reference to deposition of said Bates.

STATE OF ILLINOIS, }
County of Cook, } *ss:*

I, Albert H. Adams, a notary public in and for the county of Cook, in the State of Illinois, do hereby certify that the foregoing depositions of William S. Bates and Joseph Dain, Jr., were taken before me at the times and place therein specified, pursuant to agreement; that the parties to the said cause were present at the taking of the same—complainant by its attorneys, Pierce & Fisher, and defendants by their attorney, L. L. Bond, Esq.—as therein appears; that before deposing the said William S. Bates and Joseph Dain, Jr., were each by me first duly sworn to tell the truth, the whole truth, and nothing but the truth in the cause now pending in the circuit court of the United States for the northern district of Illinois, wherein The Acme Hay Harvester Company is the complainant and Stephen Martin

et al. are the defendants; that the said depositions were reduced to writing from the statements of said William S. Bates and
400 Joseph Dain, Jr., and the same duly subscribed by them, as therein appears.

And I do further certify that I am neither attorney nor of counsel for any of the parties in said depositions or caption named and am in nowise interested in the result of said cause.

In testimony whereof I have hereunto set my hand and affixed my notarial seal this thirty-first day of May, A. D. 1886.

ALBERT H. ADAMS,
[SEAL.] *Notary Public.*

401 DEFENDANTS' EXHIBIT PENNOCK PATENT. A. H. A., N. P.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of letters patent granted Moses Pennock and Samuel Pennock, February 17, 1827, for improvement in the hay and grain horse-rake.

In testimony whereof I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be
[SEAL.] affixed this 11th day of May, in the year of our Lord one thousand eight hundred and eighty-six, and of the Independence of the United States the one hundred and tenth.

M. V. MONTGOMERY,
Commissioner.

402 UNITED STATES OF AMERICA:

To all to whom these letters patent shall come:

Whereas Moses Pennock and Samuel Pennock, citizens of the United States, have alleged that they have invented a new and useful improvement in the hay and grain horse-rake, which improvement they state has not been known or used before their application; hath affirmed that they do verily believe that they are the true inventors or discoverers of the said improvement; have paid into the Treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State signifying a desire of obtaining an exclusive property in the said improvement and praying that a patent may be granted for that purpose:

These are, therefore, to grant, according to law, to the said Moses Pennock and Samuel Pennock, their heirs, administrators, or assigns, for the term of fourteen years from the seventeenth day of February, one thousand eight hundred and twenty-seven, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said improvement, a description whereof is given in the words of the said Moses Pennock and Samuel

Pennock themselves in the schedule hereto annexed and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the United States to be hereunto affixed.

Given under my hand, at the city of Washington, this seventeenth day of February, in the year of our Lord one thousand eight hundred and twenty-seven, and of the Independence of the United States of America the fifty-first.

[SEAL.] J. Q. ADAMS.

By the President:

H. CLAY,
Secretary of State.

403 CITY OF WASHINGTON, *To wit:*

I do hereby certify that the foregoing letters patent were delivered to me on the seventeenth day of February, in the year of our Lord one thousand eight hundred and twenty-seven, to be examined; that I have examined the same and find them conformable to law, and I do hereby return the same to the secretary of state within fifteen days from the date aforesaid, to wit, on this seventeenth day of February, in the year aforesaid.

WM. WIRT,
Attorney General of the United States.

(Here follows diagram marked p. 403½.)

404 *Moses Pennock and Samuel Pennock Letters Patent.*

The schedule referred to in these letters patent and making part of the same, containing a description in the words of the said Moses Pennock and Samuel Pennock themselves of their improvement in the hay and grain horse-rake.

The instrument, as now improved, called the self-discharging hay and grain horse-rake consists of the following parts, which, as far as to the specification, is considered as belonging to the public, but which was necessary to be described the better to understand the specification of the improvement hereinafter specified:

A long beam lying in a horizontal position, the dimensions of which may be varied at the option of the maker, but usually nine or ten feet in length and about three inches square, compasses the head of the self-discharging hay and grain horse-rake.

From the anterior side of the rake head projects a row of pointed teeth about two feet in length, which may be made of iron or wood.

At equal distance from the ends and on the inferior side of the rake head *and* attached two pieces of timber, which may be three

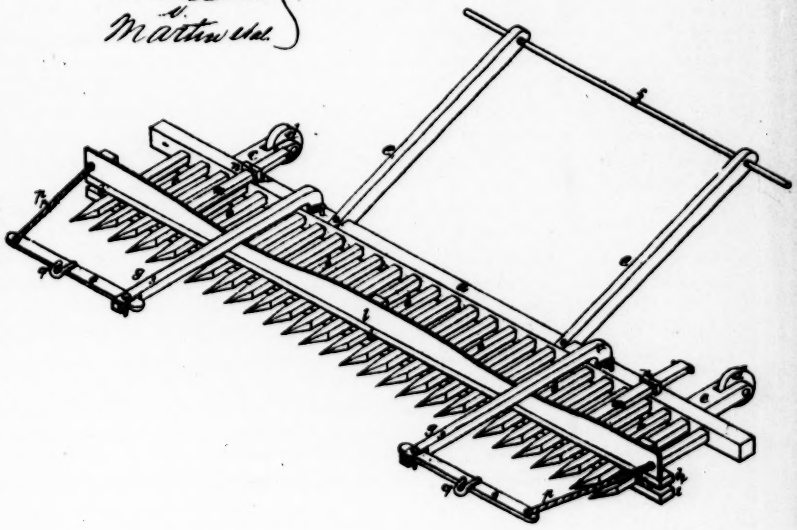
403½

Moses Samuel
M. & S. Pennock.
Horse Rake.

No Patented. Feb. 17. 1837

Hay and Grain Horse Rake

No. 345
Acme Hay
Harvester Co.
v.
Martin et al.
p. 403½



and a half or four inches broad and about two inches thick, and which project about ten or eleven inches backwards from the rake head.

The posterior ends of these pieces are mortised in such a manner as to admit the revolution of two small wheels about six inches in diameter, which are placed near the ends of these pieces, and
405 the axles of which pass through the jaws of the mortise near their outward extremities.

Two handles of a convenient length for guiding the instrument are inserted in the head and are joined by a round passing through them near the superior extremities. The round may be held in the hands. When the machine is in use, on the anterior edge of the upper side of the rake head, at equal distances from the ends, are attached, by means of strong hooks and eyes, two shafts about three feet long and of convenient thickness, with broad bases curved towards the posterior ends and the anterior ends mortised horizontally.

Specification.—The discharger is a frame-work composed of several pieces—a piece of lath or scantling—the dimensions of which may be varied, but usually about one inch and a quarter in thickness and two inches and a half in breadth; lying horizontally on the ground, parallel and about square in length to the head of the rake, is connected to a piece of about equal dimensions by means of several studs, one near each end, another near the middle of the pieces.

These pieces are placed at the distance of about two or two and a half inches apart, more or less, according to the size of the teeth. The studs passing several inches through the upper piece become in continuation tenons, to which is fastened a board from half an inch to an inch in thickness, varying in breadth from four to six inches and equaling in length the pieces of scantling. This board is made narrower in those parts over which the shafts are to work, and its edge is placed towards the pieces of scantling below its broad side, lying in the same plane with their anterior edges or sides. It is designed to assist in preventing the hay or grain gathered by the teeth from falling over the head, as well as to aid in removing the mass
406 collected upon the teeth of the rake. To the superior side of the upper piece of scantling and at equal distances from the ends are attached two strips of wood, the dimensions of which may be two inches in breadth by one inch in thickness, and which extend about twenty-nine or thirty inches, more or less, in a posterior direction and form slides. These slides pass through two staples driven into the head of the rake opposite to the places where they are attached to the scantling.

Through the posterior end of each slide a bolt is driven to prevent the slide from slipping entirely through the staple and to keep the discharges from being drawn entirely beyond the teeth. Connected with the anterior ends of the shafts by means of a hinge are two levers about two feet in length. At the other ends of these levers are attached two chains or ropes about twenty-eight or twenty-nine inches in length, which pass through holes in the outward extremities of the board before mentioned and are connected to the upper

piece of scantling. To the middle of each lever is fastened a hook to which the horse that is to draw the machine is geared.

MOSES PENNOCK.
SAMUEL PENNOCK.

Witnesses:
JOSHUA TAYLOR.
THOMAS TAYLOR.

Patented Feb'y 17th, 1827.
Ex.: E. L. L.; K. E.

Endorsed: Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

408 UNITED STATES PATENT OFFICE.

W. W. BALDWIN and A. S. LYMAN, of Philadelphia, Pennsylvania.

Improvement in Horse-Rakes.

Specification forming part of Letters Patent No. 5587, dated May 16, 1848.

To all whom it may concern:

Be it known that we, M. W. Baldwin and A. S. Lyman, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful horse-rake for raking and loading hay, &c.; and we do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

(Here follows diagram marked p. 407.)

Figure 1 is a plan of the rakes attached to a hay-wagon; Fig. 2, an elevation of the same, and Fig. 3 a cross vertical section taken at the line X X of Fig. 1.

The same letters indicate like parts in all the figures.

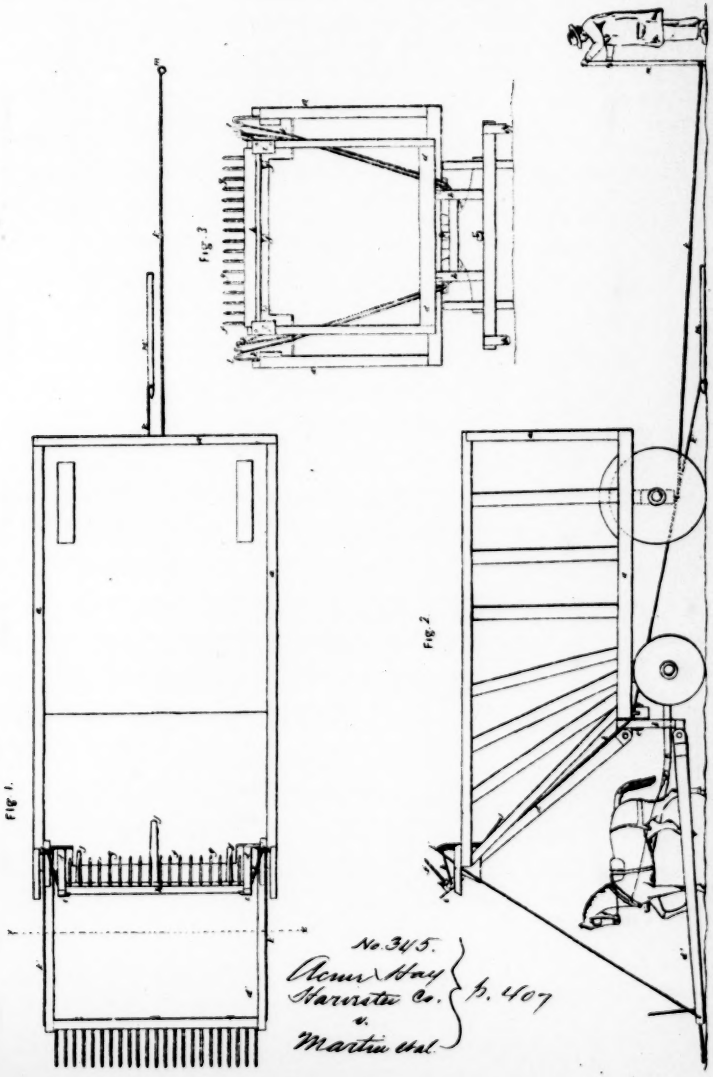
The nature of our invention consists in raking the hay by means of two rakes attached each to the forward part of an appropriate frame jointed to the forward part of a hay cart or wagon, one frame being shorter than the other, that the rake which it carries may clear and work within the other, so that as soon as one is filled it shall be elevated to deposit the hay in the wagon, the other in the meantime receiving the charge, and vice versa, the rakes being operated during the forward movement of the wagon by means of ropes operated by the attendant or by the rotation of the wagon-wheels.

In the accompanying drawings, *a* represents a four-wheeled wagon, of the usual construction, for gathering hay, to the forward part of

Lyman & Baldwin.

Hay Loader.

No 5587 Patented May. 16, 1848.



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Acme Hay Harvester Co. v. Martin et al. } p. 407

which is connected a vertical frame, *b*, by means of a screw-bolt, *c*. To the upper part of this frame is jointed a frame, *d*, made of sufficient length to reach the upper edge of the hay-box of the wagon, and to swing, when moved up and down, clear of the horses, that are harnessed to the tongue *e* of the wagon in the usual manner. The forward part of this frame carries a rake, *f*, consisting of a series of teeth, *g*, projecting from the forward edge of a straight beam or shaft, *h*, having journals at each end that turn in the side pieces of the frame *d*. The beam of this rake is flat, and each of the side pieces of the frame is provided with a flange, *i*, on which the flat face of this beam rests, to prevent the rake from turning only so far as to bring the teeth to a horizontal position when the frame is let down, their weight always insuring this, and one corner of the beam is rounded to permit the rake to make a quarter-revolution backward when the frame is thrown up against the front of the hay-box, the weight of the hay resting against pins or arms *j j j*, that project from the beam of the rake and at right angles with the teeth, these pins or arms having the effect, also, to retain the hay as the rake is moved forward to receive its load. Another frame, *d'*, similar in every respect to the one just described, except that it is wide enough to play freely outside of it and long enough to work clear of the first rake, is jointed or hinged to the lower edge of the frame *b*, and this second frame is provided, in like manner, with a rake of similar construction, and operated and connected in the same way. To the forward end of each of these frames there are two ropes, *k k k' k'*, attached one at each side, which pass up through guides *l' l'* at the top and forward part of the hay-box, and from these guides the ropes pass down in front of and under the wagon, the two for each frame being united in one, and these attached each to a hand-lever, *m m'*, made with one end sharp to penetrate the earth with facility, the ropes being attached to them near to the sharp end, so that the attendant can have a strong purchase when the sharp end is struck into the ground, and thus enable the forward motion of the wagon to elevate either of the frames with the rake charged with hay, and thus discharge it into the hay-box. When discharged the attendant liberates the lever, which is drawn out of the ground to permit the frame to descend as the attendant strikes the other lever in the ground to elevate the other frame and rake, which in the meantime has received its charge of hay. In this way the rakes are alternately charged, elevated, and discharged, and again let down by the attendant alternately operating the levers attached to the ropes.

The frame *b*, to which the rake-frames are jointed, being connected with the forward part of the wagon by a longitudinal bolt, *c*, permits the rake-frames to vibrate and adapt themselves to the lateral undulations of the surface of the ground, while the joints on which they turn, to admit of their being elevated, permit of their following the direct undulations.

The rake-frames, it will be seen, are to be made of sufficient
409 length to swing clear of the horses, the height of the hay-box of the wagon admitting of this.

It will be obvious from the foregoing that the rake-frames, instead of being jointed to the vibrating frame *b*, may be jointed or hinged directly to the forward part of the wagon, taking care to make the joints of attachment of the shorter one higher than for the other, that when thrown up the rake may pass clear of the upper edge of the hay-box; and that the rake-frames, instead of being operated by the hand-levers, may be lifted and let down by the turning of the wagon-wheels by simply attaching the ropes to windlasses on the rear axle-tree, which can be clutched and unclutched with facility, either by a hand-lever or by a cam, on either of the wheels; but such an arrangement would render the apparatus more costly and liable to derangement, and the hand-levers, from the facility with which they can be operated, are deemed the best. Instead of simply attaching the ropes to the rake-frames and passing them through the guides or over pulleys attached to the wagon, this may be modified by attaching to each side of the rack-frame a segment of a circle with a deep groove in it, in which the rope attached to the rake-frames passes, so that, (the segment extending up from the upper side of the rake-frames,) the ropes resting on the periphery of the segments, they can pass over the body of the wagon or by the side of it without the necessity of using either guides or pulleys.

The horses, if desired, may be harnessed to the sides or the back of the wagon, or if the hay-box be so low as not to require the rake-frames to be made of sufficient length to swing over the horses.

If desired, the beam of the horse-rakes may be provided with an arm or arms so located as to strike against the hay-box when thrown up to insure the turning of the rake to deliver the hay. Instead of the two rake-frames acting alternately, one only may be used by stopping the horses whenever the rake is charged to elevate and discharge the hay.

What we claim as our invention, and desire to secure by letters patent, is—

The method, substantially as herein described, of raking and elevating hay and delivering it into a wagon or other receptacle by means of the rake-frames so jointed or otherwise connected with the wagon as to admit of being elevated to raise and discharge the hay into the hay-box of the wagon or any other receptacle, as described.

M. W. BALDWIN.
A. S. LYMAN.

Witnesses:
JOHN A. WHITE.
LANE SCHOFIELD.

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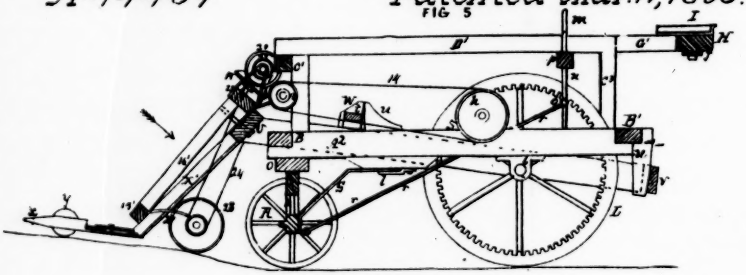
Sheet 2

B. T. Roney.

Mower.

No 14409 Patented Mar. 11, 1856.

FIG 5



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v.
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FIG 6

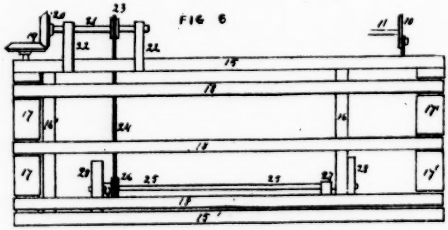


FIG. 7.

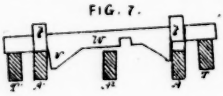


FIG. 8.

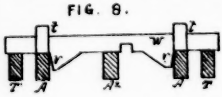


FIG. 11.

FIG. 10.

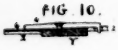
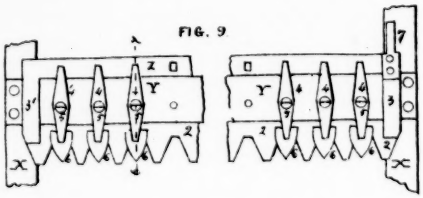


FIG. 9



Witnesses { Henry Howson
William E Walton

Inventor
B. T. Roney

410

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Sheet 1

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B. T. Roney.

Mower.

No. 14409 Patented Mar. 11, 1856

FIG. 1.

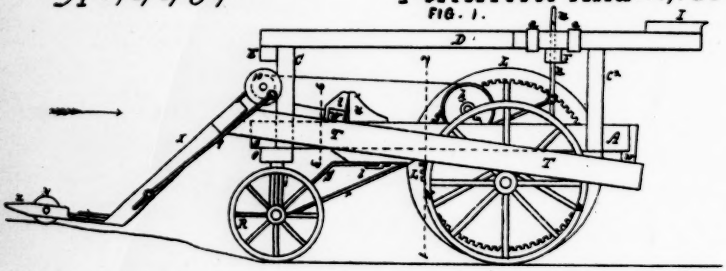


FIG. 2.

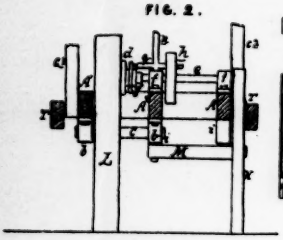


FIG. 3.

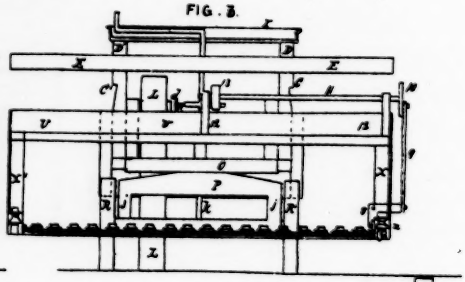
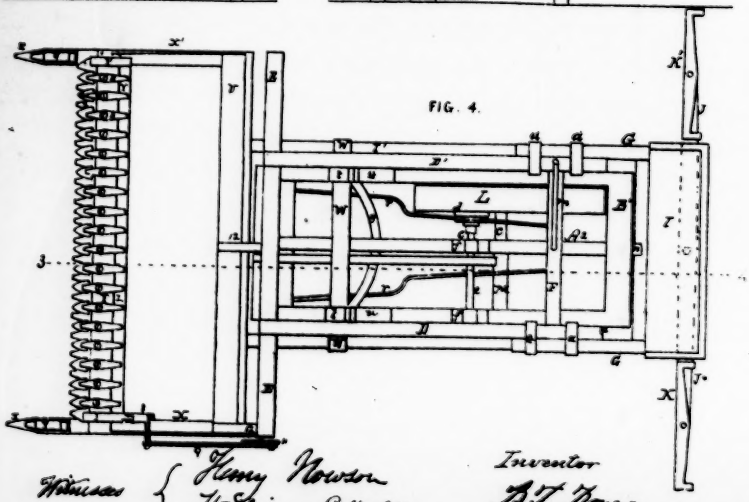


FIG. 4.



Witnesses { Henry Nowson
William E. Walton

Inventor
B. T. Roney

412 UNITED STATES PATENT OFFICE.

B. T. RONEY, of Philadelphia, Pennsylvania.

Improvement in Grain and Grass Harvesters.

Specification forming part of Letters Patent No. 14409, dated March 11, 1856.

To all whom it may concern:

Be it known that I, Benjamin T. Roney, of the city of Philadelphia, and State of Pennsylvania, have invented certain new and useful improvements in mowing and reaping machines, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the figures and letters of reference marked thereon.

My invention relates to that class of mowing and reaping machines in which the cutters are situated in advance of the horses, and it consists in constructing a machine with two distinct frames separate from, but dependent upon, each other. One frame is the permanent or gear frame, to which are attached the supporting-wheels, the driving-wheel, and the gearing for producing the motion to be transferred to the second part of my machine, which I call the "movable" or "cutter" frame. The motion for operating the cutters, produced by the driving-wheel and gearing on the gear-frame, is communicated by a band or chain from a pulley on the said gear-frame to a pulley on the cutter-frame. These two frames are so adapted to each other, by means hereinafter fully explained, that the cutter-frame may be elevated or lowered and oscillate longitudinally and laterally on the gear-frame, allowing the cutters to operate on level or uneven ground without disturbing the tightness and efficacy of the above-mentioned driving band or chain.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

(Here follow diagrams marked pp. 410 & 411.)

On reference to the drawings, which form a part of this specification, figure 1 is a side elevation of my improved machine as arranged for mowing. Fig. 2 is a transverse section on the line 1 2, Fig. 1, looking in the direction of the arrow. Fig. 3 is an end elevation of Fig. 1, also looking in the direction of the arrow. Fig. 4 is a ground plan of Fig. 2. Fig. 5 is a longitudinal sectional elevation on the line 3 4, Fig. 4, showing the supplementary frame as attached when the machine is used for reaping. Fig. 6 is a face view of the supplementary frame as it appears when looking in the direction of the arrow, Fig. 5. Figs. 7 and 8, sectional views on the line 5 6, Fig. 1, and illustrating the adjustability of the cutter-frame; Fig. 9, an enlarged plan of part of the cutting apparatus; Fig. 10, a transverse section on the line 6 7, Fig. 9; Fig. 11, a sec-

tion still further enlarged, showing the manner of connecting the cutter-levers to the fulcrum-bar.

The same letters of reference allude to similar parts throughout the several views.

A, A′, and A^2 are three longitudinal beams, tied together at the front end by the cross-piece B and at the rear end by the cross-piece B′. C, C′, C^2, and C^3 are four upright pieces, secured at the bottom to the longitudinal beams A and A′, and at the top to the bars D and D′, and connected together in front by the transverse bar E and at the back by the cross-piece F. The above parts form what I term the "permanent" or "gear" frame of the machine.

At the end of the bars D and D′ is secured by means of staples *a a*, so as to be adjustable, a frame composed of the side pieces G and G′, and the strong cross-piece H. On this frame is secured the seat I for the driver. Underneath the cross-bar H, and swiveling on a pin attached to the same, is the lever J, to the opposite ends of which are jointed the whiffletrees K and K′ for receiving the traces of the horses.

To the under side of the longitudinal pieces A′ and A^2 are secured the boxes *b b* for the shaft *c*, and to the latter is attached the driving-wheel L, having internal teeth, which gear into the teeth of the pinion *d* on the shaft *e*. This shaft revolves in boxes *f f*, secured to the top of the longitudinal beams A and A^2. The shaft *e* is furnished with a clutch, *g*, which has projections fitting into similar projections on the pinion *d*, so that by withdrawing the clutch from the pinion the movement of the shaft *e* is instantly stopped. The shaft *e* is also furnished with a pulley, *h*, hereinafter referred to.

M is an axle-tree, secured to hangers *i i* which are attached to the under side of the longitudinal beams A and A^2 of the gear-frame. On the end of this axle-tree is hung the supporting-wheel N.

O is a beam secured under and across the front end of the beams A, A′, and A^2, and resting on the bar P, attached by means of upright pieces *j* to the front axle-tree, Q, on the ends of which are hung the wheels R and R′. A pin, *k*, passing through the
413 axle-tree Q and bar P into the beam O, allows the frame with the wheels R and R′ to swivel, similar to those of an ordinary wagon. A bent bar, S, having its two ends attached to the axle-tree Q and passing through a staple, *l*, on a piece projecting from the under side of the beam A^2, serves to steady and guide the frame as it is being turned by means of the cranked handle *m*, which forms a part of or is otherwise attached to the vertical spindle *n*. The latter passes through and is guided by the cross-piece F, its end bearing in a hole in the longitudinal beam A^2.

The spindle *n* is furnished with a cross-piece, *q*, the ends of which are connected by means of rods *r r* to eyes fastened near each end of the axle-tree Q, thus allowing the operator on the seat I, by simply turning the handle *m*, to guide the machine as it is drawn over the ground.

T and T′ are longitudinal beams, connected together in front by the beam U and at the back by the cross-piece V. They are further connected together by a third cross-piece, W, which has two lugs, *t*,

coinciding with and bearing against two similar lugs, *u*, secured to the top of the longitudinal beams A and A′. The cross-piece W has likewise two beveled pieces, *v*, (see Figs. 7 and 8,) bearing against the inside of the longitudinal pieces A and A′. A curved piece, *w*, suspended from and secured to the cross-piece B′ of the gear-frame, fits into a slot in the back cross-bar, V. Thus the movable frame, composed of the longitudinal pieces T and T′ and cross-pieces U, V, and W, with attachments, more fully described hereinafter, is maintained laterally and longitudinally in its proper position as regards the gear-frame by the lugs *t* and *u*, beveled piece *v*, and suspended piece *w*. Still it may be readily raised and lowered with the lugs *t* and *u* as the point of vibration, and likewise may be raised to an angular position laterally with the gear-frame, as seen in Figs. 7 and 8, and more fully alluded to hereinafter.

To the opposite ends of the cross-bar U of the movable frame are secured the diagonal bars X and X′, which are bent toward the bottom and terminate in the master guard-teeth *x* and *x′*, each of which is furnished with a small roller, *y*, resting on the ground. Near the point where the arms X and X′ are bent they are connected together by the fulcrum-bar Y. (See Fig. 9.) At the back of this fulcrum-bar, and fitting snugly against it, is another bar, Z, and in front is the cutter-bar 2, which is connected to the bar Z by the cross-pieces 3 and 3′ in such a manner that both bars may move together, the fulcrum-bar being the guide.

A series of cutter-levers, 4, have their fulcrums on pins 5, screwed into the fulcrum-bar V on one end. These levers have points projecting downward into oblong slots in the bar Z, as seen in Fig. 9. The other ends are furnished with cutters 6, having their sides and points beveled to a sharp cutting-edge, the under side of the cutters being flat. The cutting projections from the cutter-bar 2 are beveled on the under side, the top being flat, so that the flat surface of upper and lower cutters are contiguous to each other.

It will be observed, on reference to Fig. 11, that the pins 5, which form the fulcrums of the levers 4, are peculiarly arranged as regards the latter. The beveled heads of the pins do not fit accurately into the countersink of the levers, but on the top edge only, the sides of the countersink having a greater inclination than those of the beveled heads. The diameter of the pins, too, are somewhat less than the eyes of the levers 4, through which they pass. The object of this arrangement will be apparent hereinafter. From the cross-piece 3 projects a pin, 7, fitting between the prongs of the forked arm of the bell-crank lever 8, the other arm of this lever being connected by means of the rod 9 to the pin on the crank-wheel 10, which is attached to the shaft 11, the latter having its bearings in the brackets 12, secured to the cross-bar U of the movable frame of the machine. To the shaft 11 is secured a pulley, 13, round which passes a strap, 14, from the pulley *h*.

The machine as above described is arranged and adapted for mowing only. The apparatus to be attached when used for reaping will be referred to hereinafter. The horses are situated outside and one on each side of the body of the machine, the traces being

secured to the whiffletrees K and K′, and the breast-chains of the horses to the ends of the cross-bar E. The distance between the whiffletrees and cross-bar E may be regulated, so as to be adapted to horses of different sizes, by sliding in or out the pieces G. As the machine is drawn over the ground the rollers *y* in the master guard-teeth *x* pass over any inequalities on the surface, causing the movable or cutter frame to oscillate and adjust itself to such inequalities or undulations, as seen in Figs. 1 and 5, the junction of the lugs *t* and *u* being the center of oscillation. This movement of the cutter-frame in no way affects the proper working of the machine or the effective operation of the cutters, for as the rollers *y* rise over elevated ground and raise the cutter-frame, the points of the lugs *t* on the bar W will bear against the tops *u* of the gear-frame, and have a tendency to project the whole of the cutter-frame slightly forward. Thus the band or chain 14 will be maintained tight round the surfaces of both pulleys *h* and 13 at whatever position the cutter-frame may be in respect to the gear-frame; and it is not only to the longitudinal vibration of the cutter-frame that the latter remarks apply, but to the lateral oscillation also, for the projecting pieces *v* are so constructed as to allow the said cutter-frame to be moved laterally at an angle, either on one side or the other, as seen in Figs. 7 and 8, according to the undulations on the ground over which the rollers *y* pass. It will be easily seen that the same remarks also apply to instances in which the front wheels, R
414 and R′, may drop either together or separately into ruts, or rise over any projections on the surface of the ground.

As the machine is drawn over the ground motion is communicated from the driving-wheel L through the pinion *d* to the shaft *e* and pulley *h*, thence through the chain or band 14 to the pulley 13 and shaft 11, and through the crank-wheel 10 and connecting-rod 9, communicating motion to the bell-crank lever 8, which imparts a reciprocating motion to the bar Z and cutter-bar 2, and consequently a vibrating motion to the cutter-levers 4, which work on the pins 5, screwed into the permanent fulcrum-bar X. The peculiar arrangement of these screws in respect to the levers 4 has been already described in reference to Fig. 11, and this arrangement is such that immediately the edges of the cutters 6 on the levers 4 bear the stalks of grain or grass against the cutting-edges on the bar 2 the said levers have a tendency to tilt over, so as to bring the cutting-edges of their cutters in close and immediate contact with the cutting-edges on the bar 2, and the stalks submitted to their action are divided much more effectually than by knives passing through fingers in the usual way. As the machine is in operation this tilting of the levers 4 takes place immediately the reversing motion occurs.

By my arrangement of causing the cutter-levers 4 to move simultaneously with the slotted bar Z and cutter-bar 2 it is evident that but one-half the movement required in ordinary machines is sufficient in this instance. Consequently the movements of the machine are quicker and more efficient.

When the machine has to be used for reaping I employ the frame

shown in Figs. 5 and 6, composed of two longitudinal pieces, 15 and 15′, connected together by the cross-pieces 16 and 16′, and furnished at each end with rollers 17 and 17′, having three recesses for receiving the endless bands 18 18 18, which pass from one roller to the other. The upper end of the spindle of the roller 17 projects above the top of the longitudinal beam 15, and is furnished with a bevel-wheel, 19, gearing into a similar bevel-wheel, 20, on the shaft 21, which has its bearings in the brackets 22 and 23, secured to the longitudinal beam 15.

On the shaft 21 is a pulley, 23, round which passes a chain or band, 24, down to and round the pulley 26 on the shaft 25. The latter has its bearings on brackets 27, secured to the lower longitudinal beam, each end of the shaft being furnished with a wheel, 28.

The frame above described is attached by means of screw-bolts to the cross-beam U of the cutter-frame, and rests toward the bottom against the diagonal arms X and X′, as seen distinctly in Fig. 5, the wheels 28 resting on the ground, so that as the machine is drawn over the ground the wheels, with their shaft, will turn, and through the strap 24 give motion to the shaft 21, and consequently through the wheel 19 and 20 to the rollers 17, causing the bands to traverse and carry the grain-stalks as they are cut by the cutters above described to one side of the machine.

It will be seen that I obtain the motion for accomplishing this end without connections to the moving parts of the gear-frame.

Having now described the nature of my invention and the manner in which the same is carried into effect, I wish it to be understood that I do not claim exclusively double cutters operating simultaneously, nor the use of vibrating cutters, nor belts for carrying off the grain to one side of the machine; but

What I claim, and desire to secure by letters patent, is—

The gear-frame, with its lugs *u u*, in combination with the movable or cutter frame, its bar W, lugs *t t*, and beveled projections *v v*, the whole being arranged and constructed substantially in the manner and for the purposes set forth.

B. T. RONEY.

Witnesses:
HENRY HOWSON.
WILLIAM E. WALTON.

417 UNITED STATES PATENT OFFICE.

B. T. CURRIER, of Bath, Maine.

Improvement in Machines for Cutting up Cotton-Plants.

Specification forming part of Letters Patent No. 27352, dated March 6, 1860.

To all whom it may concern:

Be it known that I, B. T. Currier, of Bath, in the county of Sagadahoc and State of Maine, have invented an improved machine for

cutting up and rooting out the stubble of cotton-plants, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

(Here follow diagrams marked pp. 415 & 416.)

Figure 1 is a plan of the machine; Fig. 2, a vertical section through the same on the line *x x* of Fig. 1.

In the cultivation of cotton it is customary, after the cotton has been picked, to hoe up or pull out from the ground the stock or stubble before the ground is again plowed, as the long stocks interfere with the plowing. This is a troublesome and expensive operation.

My present invention consists in a machine for cutting the cotton-stubble into short pieces and for pulling up the root or stump of the plants and dropping them in rows on the ground, so that they may be readily turned under by the plow.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried out the same.

In the said drawings, the frame of the machine consists of two heavy bars, A A′, on each side of the machine, which are connected together in pairs by short braces *a a′* at the front and rear ends, and the frames or pairs of bars are connected and held in position, as shown in Fig. 1, by two stout cross-braces, *b*, near the rear end of the machine, and by a broad flat bar, B, attached at each end to a standard, *d*, (dotted in Fig. 2,) which rises from the bar A.

Within the frame formed by the bars A A′, on each side of the machine, is a carrying-wheel, C, to the outer side of which is attached a gear, *c*, of less diameter than the wheel itself, which engages with a beveled pinion, *f*, on a shaft, *e*, having its bearings in the bar A and in the end of the bar B. This shaft *e* extends up a little above the bar B and carries a pulley, *g*.

Two shafts, D, which have projecting from them series of cutters *i*, have their bearings in the bar B and in a stirrup, E, which is suspended by braces *k* from the lower side of each bar A′, one on each side of the machine. To the top of each of these shafts D is attached a pulley, *l*, and a cord or suitable band, *m*, from one of the pulleys *g* is led over one of the pulleys *l*, the bands being so arranged by crossing or otherwise that the shafts D will be revolved toward each other, as indicated by the arrows *i*. The shafts D are placed so that when the machine is being drawn over the ground and the frames A A′ are horizontal, or nearly so, as shown in Fig. 2, these shafts shall be inclined forward at the top. The stirrup E is inclined to the horizon, rising toward the rear of the machine.

To the lower end of each shaft D, where it projects below the stirrup, is attached a pulley, *n*, on the under surface of which is a series of fingers or pins, 5, which extends out a little beyond the periphery of the pulley. Immediately in the rear of the pulley *n* is another pair of pulleys, *p*, one on each side, which are supported in suitable

B. T. Currier.

Corn Harvester.

No. 27352 Patented Mar. 6, 1860.

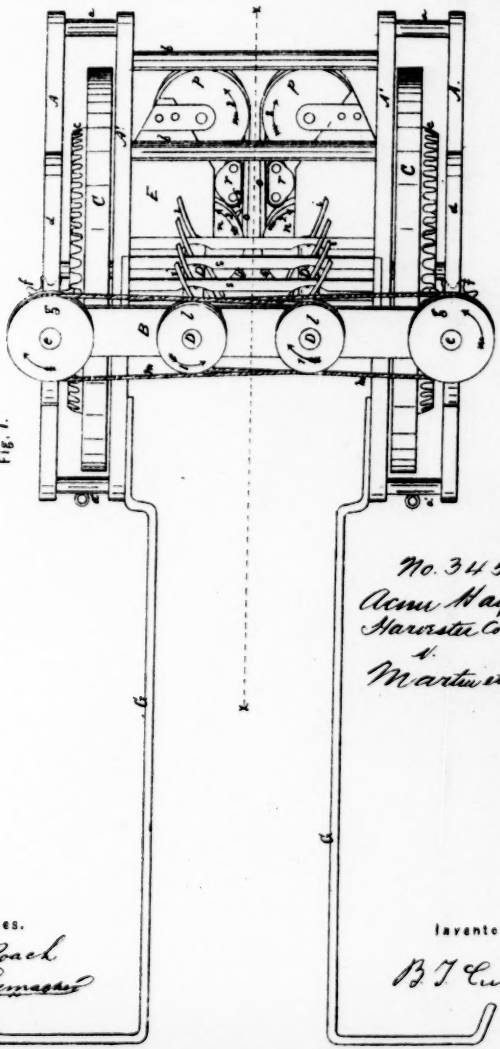


Fig. 1.

No. 345.
Acme Hay
Harvester Co.
v.
Martin et al.
p. 415

Witnesses.
Thos. R. Roach
P. E. Fetchemacher

Inventor.
B. T. Currier

B. T. Currier.

Corn Harvester.

No 27352 Patented Mar. 6, 1860.

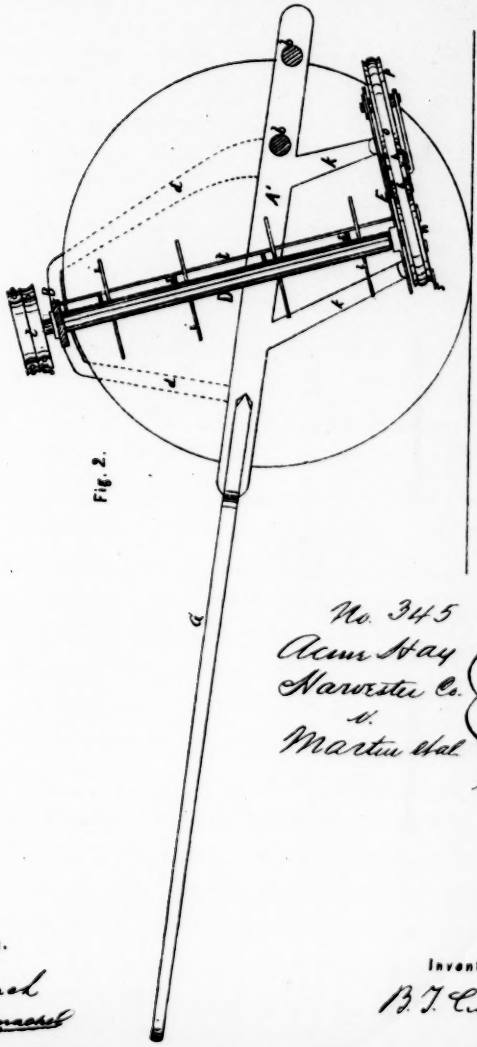


Fig. 2.

No. 345
Acme Hay
Harvester Co.
v.
Martin et al.
p. 416

Witnesses.

Thos. R. Roach
P. E. Tetschemacher

Inventor.

B. T. Currier

bearings attached to the stirrup E. A continuous band, *o*, (in practice a chain would be used,) is led over a pulley, *n*, and a pulley, *p*, on each side, the two bands running close together in the middle of the machine.

Friction-rolls 6 in bars *r*, attached to the stirrups E, bear against the cords *o* between the pulleys *n* and *p* and keep them parallel. The pulleys *n* and *p* are driven in the direction indicated by the arrows 2.

A series of metal bars, *s*, are placed immediately behind the shafts D and in close proximity to the cutters *i*. They are attached at each end to upright bars *t*, fastened at top to the bar B and at bottom to the stirrup E. The bars *s* are so placed that as the shafts D are revolved the knives *i* will pass over the front edges of the bars close to them, and the bars thus serve to support the cotton-stock while being cut by the knives. The animals drawing the machine are placed one on the outside of each of the shafts G, and draw on staples in the braces *a'*. They walk one on each side of a row of plants.

The wheels C are here represented as plain disks; but they may be of any convenient form, and, if necessary, the tread may be corrugated or roughened to give them sufficient hold on the ground to drive the shafts D.

The following is the operation of this machine: It is driven
418 over the field lengthwise of a row of plants, the wheels C passing one on each side of the row. The bars S are thus brought into contact with the standing plants, and as the shafts D are revolved rapidly in the direction of their arrows the plants are cut by the knives *i* into short pieces, which fall down to the ground. As the machine passes on the stump of the plant is seized by the fingers 5 on the pulleys *n* and is carried between the bands *o*, (or chains,) which run close enough together to grasp and carry it up the incline in which the pulleys *n* and *p* are placed. This draws the roots from the ground and drops the stump at the rear of the machine. The plants are thus strewn along the ground in rows and in small pieces, which will not obstruct the plows, and may be readily plowed under.

What I claim as my invention, and desire to secure by letters patent, is—

The revolving knives or cutters *i* and the pulleys *n p*, with their band *o*, operating substantially as described, for the purpose specified.

B. T. CURRIER.

Witnesses:
THOS. R. ROACH.
P. E. TESCHEMACHER.

420 UNITED STATES PATENT OFFICE.

LEWIS W. MASON, Shelburne Falls, Massachusetts.

Improvement in Carriages.

Specification forming part of Letters Patent No. 47211, dated April 11, 1865.

To all whom it may concern:

Be it known that I, Lewis W. Mason, a resident of Shelburne Falls, in the county of Franklin and State of Massachusetts, have made a new and useful invention having reference to wheel-carriages; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

(Here follows diagram marked p. 419.)

Figure 1 denotes a top view, and Fig. 2 a side elevation, of it.

The nature of my invention consists in a peculiar arrangement, as hereinafter specified, of two sets of shafts and a cross-bar with respect to two whiffletrees, whereby the cross-bar is brought in rear of the draft-animals when they are applied to the shafts, and such shafts become a substitute for a pole as ordinarily employed. Also, in the combination and arrangement of a connector with the two sets of shafts combined and arranged together as specified. Also, in the combination and arrangement of mud-guards with the two sets of shafts and their cross-bar arranged together substantially as hereinafter specified.

In the drawings, A B C D are four shafts or thills projecting from a single bar, E, provided with two whiffletrees, F G, and also with two curved arms, H I, the whole being arranged as represented. The said parts H I are to be hinged at their outer ends to the front axle-tree of a carriage, so as to connect the shafts therewith as a single set of shafts are ordinarily applied to an axle-tree. Of the two sets of shafts or thills A B and C D the two adjacent shafts—viz., B and C—are to be provided with a connector, K, which is a leather strap extending from one shaft to the other, and so applied to the two as to connect them near their front ends in such manner that the two shafts may be caused to co-operate in bearing the outward lateral strain of either of the horses or animals, which may be at any time harnessed to the two sets of shafts, they being intended to receive a pair of horses or draft-animals, and so that one of such pair shall be between the thills of each pair A B or C D of shafts. By so connecting the two inner shafts B and C the lateral strain tending to separate either of the shafts B C from its cross-bar, or to weaken the connection of it with such bar, will be counteracted by the rigidity of three shafts, or, at least, by that of the two inner shafts. The two inner shafts, when so conjoined by the connector

L. W. Mason.

Poles & Shafts.

No. 47,211. Patented Apr. 11, 1865.

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Fig. 1.

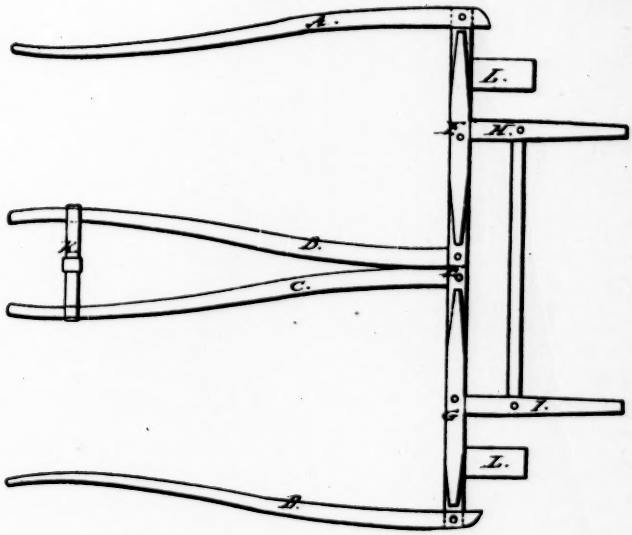
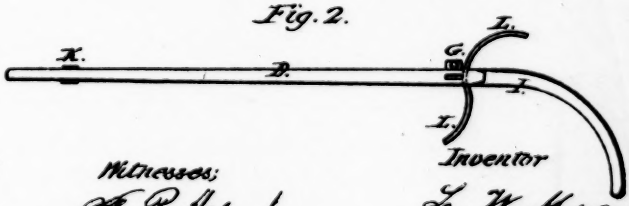


Fig. 2.



Witnesses;
F. P. Hale Jr.
Frederick Curtis

Inventor
L. W. Mason
by his attorney
R. H. Eddy

J. King,
Horse Rake.

No 55672. Patented. June, 19. 1866.

No. 345.
Acme Hay
Harrisha C.
v.
Martin et al
p. 421

Fig. 1.

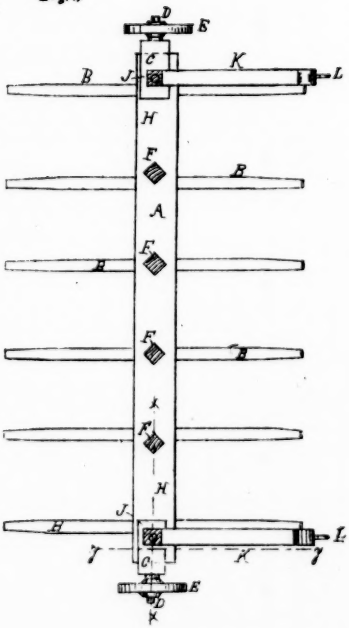


Fig. 2.

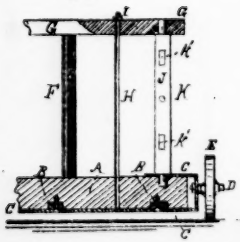
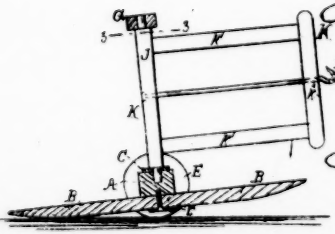


Fig. 3.



Inventor:
Jacob King
Per Munn & Co
Attorneys
Witnesses:
J. W. B. Langton
Wm. Trewin

K, serve also to protect the outer shafts, A and D, from effects of such lateral strain.

A mud-guard, L, is applied to the cross-bar and in rear of each set of shafts, and is arranged in manner with respect to them as shown in the drawings. It serves to intercept mud from the wheels, and thereby prevent it from being thrown upon a horse when in the thills.

The two sets of shafts, combined with one cross-bar, as described, will often be found preferable to a pole in the application of a pair of horses to a carriage, as by means of such sets of shafts common shaft-harnesses may be used instead of pole-harnesses. The spring or elasticity of the shafts will generally suffice to prevent the irregularity of movement of either horse from being inconvenient to the other, or from so acting on the cross-bar as to cause the shafts of the said other horse to play or move in accordance with those of the other when the two horses may not be stepping alike.

I do not claim the combination and arrangement of two sets of thills with a cross-bar and a pole in manner as shown in the patent of Solomon Bolles, dated November 26, 1861.

I claim—

1. My peculiar arrangement of two sets of shafts, A B C D, and a cross-bar, E, with two whiffletrees, F G, whereby the cross-bar carrying the whiffletrees is brought in rear of the draft animals when they are between the shafts.

2. The combination and arrangement of the connector K and the two sets of shafts A B C D and the cross-bar E.

3. The combination and arrangement of the two mud-guards L L with the two sets of shafts and their cross-bar.

LEWIS W. MASON.

Witnesses:

R. H. EDDY.

F. P. HALE, JR.

422 UNITED STATES PATENT OFFICE.

JACOB KING, of Omaha, Nebraska.

Improvement in Horse-Rakes.

Specification forming part of Letters Patent No. 55672, dated June 19, 1866.

To all whom it may concern:

Be it known that I, Jacob King, of Omaha, in the county of Douglas and State of Nebraska, have invented a new and useful improvement in horse hay-rake; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

(Here follows diagram marked 421.)

Figure 1 is a top view of my improved rake, the top rail of the upright frame being cut off through the line *z z*, Fig. 3. Fig. 2 is a detail sectional view taken through the line *x x*, Fig. 1. Fig. 3 is a detail sectional view taken through the *y y*, Fig. 1.

Similar letters of reference indicate like parts.

My invention has for its object to furnish a horse hay-rake by means of which the hay may be taken from any part of the meadow and collected at any given point without the necessity of a wagon or cart; and it consists of a hay-rake constructed as hereinafter more fully described.

A is the bar, in which the teeth B are set. The teeth B are let into the lower sides of the bar A, as shown in Fig. 3, where they are secured in place by a band, C, passing along the under side of the bar A and overlapping the ends of the said bar A, as shown in Figs. 1 and 2: and the teeth B and band C are secured to the bar A by screws D passing through the band and teeth into the bar A, as shown in Figs. 2 and 3. The band C, where it passes over the ends of the bar A, projects a little beyond said bar, and to this projecting part are attached the ends of the axles D, upon which the wheels E are placed. These wheels E are of such a size as will raise the bar A slightly above the ground, so that the rake may travel easily over the ground.

F are the uprights of the vertical frame of the rake. These uprights are mortised into the bar A and the top rail, G, and the frame is strengthened and held together by the rods H and nuts I. This frame is designed to hold the hay upon the rake while being transported to the desired point.

The end uprights, J, are made to revolve in the bar A and rail G, as shown in Figs. 2 and 3. Into these uprights J are framed the bars k' of the swinging frames K, and the said bars k' are connected at their outer ends by the bars k^2, as shown in Fig. 3.

L are the draft-hooks, which pass through the frame K, and are secured thereto, as shown in the drawings. To these hooks the horses are attached, one at each end of the rake.

When the hay has been collected and drawn by the rake to the stack or other desired point, the horses are turned around and the rake drawn from beneath the hay.

By means of this rake the hay can be very quickly collected into one spot without its being necessary to use a wagon or cart, thus saving much time in collecting the hay.

I claim as new and desire to secure by letters patent—

The rake provided with sets of teeth on each side of the head, and drawn by means of the reversible swinging-frames K, constructed and operating substantially as described and represented.

JACOB KING.

Witnesses:

JOHN H. SAHLER.

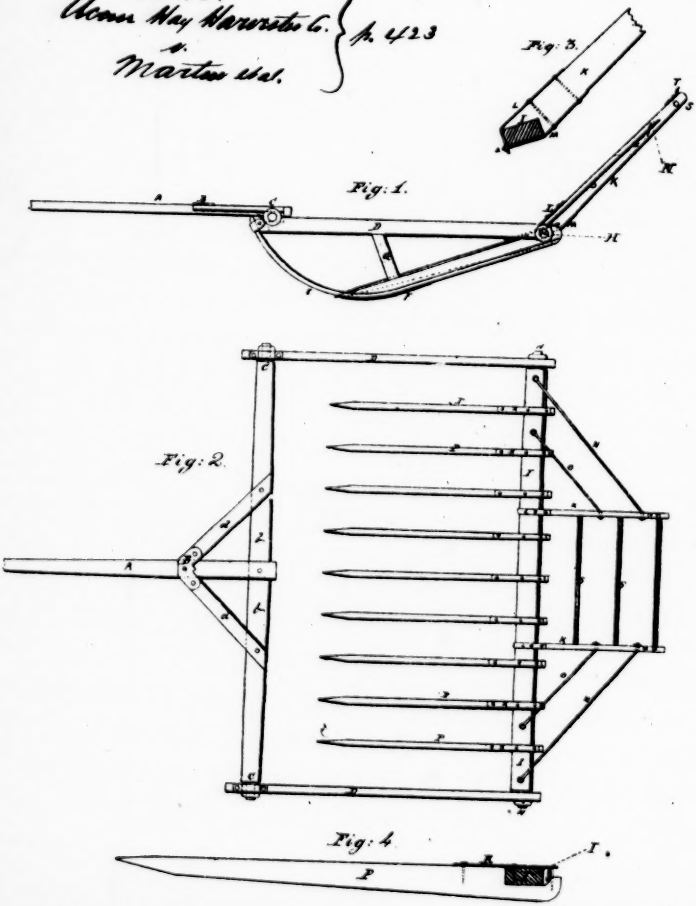
ISAAC I. HASCOLL.

F. Wicks.

Revolving Rake.

No. 79284 Patented Jun. 23, 1868.

No. 345
Acme Hay Harvester Co.
v.
Martin et al.
} p. 423



Witnesses
Ken Kelly
J. S. Boughton

Inventor
Frank Wicks

424 UNITED STATES PATENT OFFICE.

FRANK WICKS, of Upper Sandusky, Ohio.

Letters Patent No. 79284, dated June 23, 1868.

Improvement in Horse-Rakes.

The schedule referred to in these letters patent and making part of the same.

To whom it may concern:

Be it known that I, Frank Wicks, of Upper Sandusky, in the county of Wyandot and State of Ohio, have invented certain new and useful improvements in hay-gatherers; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, making part of this specification, in which—

(Here follows diagram marked p. 423.)

Figure 1 is a side elevation.

Figure 2, a top view.

Figure 3, a vertical section, showing the method of attaching the handles; and

Figure 4 is a section showing the method of attaching the teeth to the cross-bar.

The nature and object of my invention are to construct a hay-gatherer, simple in form and construction, and easy and practical in its operation.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Similar letters of reference refer to the same parts in the different drawings.

E is a runner, of which there are two.

D D are the runner rails.

A is the tongue.

G is a post, extending from the runner to the rail, and located at or near the point where the runner begins to turn upward. It is also located back of the front point of the teeth, making the front end of the teeth come in advance of the posts as the machine is drawn over the ground.

F is an iron shoe, placed on the bottom of the runner, at the point where it begins to turn upwards, and extending a sufficient distance each way to accomplish the object desired, which is to prevent the wearing of the runner at this point as it is drawn over the ground.

I is a cross-bar, extending from the heel of one runner to the other. To this cross-bar, I, are attached the teeth P P.

b b is a cross-bar from the front end of one runner to the front end of the other, and to which is attached the tongue A.

d d are braces, extending from the tongue to the cross-bar *b b*.

k k are the handles, attached to the cross-bar I, to which they are attached by means of two straps of iron, one of which extends from the upper side, and the other from the lower side of the handle. Around the cross-bar I, near one end of the strip of iron passing over the upper side of the handle, is a hole, through which the lower end of the other strip of iron passes, and terminates in a screw, on which is placed a nut, as shown at *a*, Fig. 3. The handles *k k* are cut so as to fit two sides of the cross-bar I, as shown at Fig. 3.

S S S are cross-rounds, extending from one handle to the other.

O and N are iron braces, fastened to the cross-bar I, and extending to the handles *k k*, they pass through the handles *k k*. On the end passing through the handles is a screw, on which is placed a nut, *t*.

The cross-bar *b b* is fastened to the front end of the runners by making a half-socket in the front ends of the rails D D, in which are placed the ends of the cross-bar, and over each end is placed an iron cap; this cap is then fastened to the rails by means of bolts and nuts.

The operation of this invention is as follows: The team is attached to the tongue A, which draws the gatherer over the ground, and the teeth gather the hay, and when sufficient is gathered, the operator, having hold of the upper round S, lifts up the heel of the gatherer a little; this act catches the points of the teeth in the ground, when the system of teeth and handles is turned over, and thus the gathered hay is deposited. The teeth and handles are brought back to their proper position by the dogs T on the handles (Fig. 3) catching in the ground and again turning them over.

By placing the post G back of the front end of the teeth, the bend of the runner is carried back of the front end of the teeth, the head of the gatherer is caused to be slightly elevated sufficiently to permit the front ends of the teeth to hug the ground by the act of drawing the gatherer over the ground, thus gathering all the hay, and relieving the operator of the necessity of lifting by main strength the heel of the gatherer to accomplish this same result.

By fastening the handles to the cross-bar I in the manner described, I am able to keep the handles snugly fitted to the cross-bar, by tightening the cross-nut *a*.

By fastening the ends of the braces O and N to the handles by means of a nut and a screw, I can always keep the handles in proper position by tightening up the nuts.

By using the caps C C over the ends of the cross-bar *b b*, in fastening it to the rails D D, I am enabled to use a much smaller rail than I otherwise could. The joints at the ends of the two cross-bars are made flexible, so as to allow the runners to conform to the inequalities of the surface.

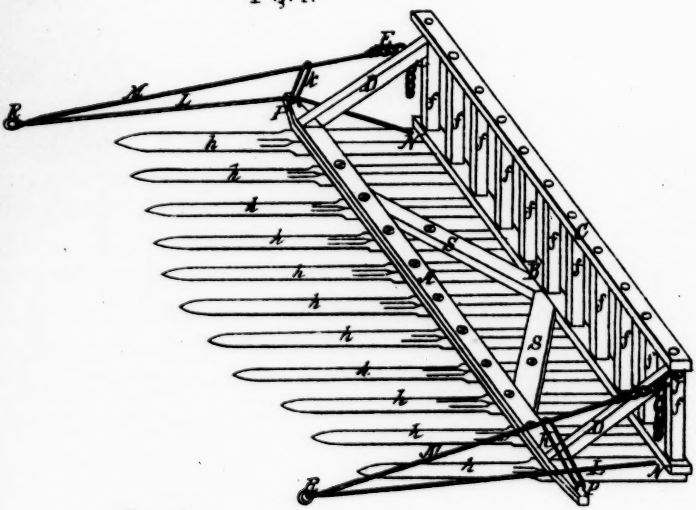
Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

G. W. Middlecoff.

Horse Rake.

No. 89,160. Patented April 20, 1869.

Fig. 1.



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Harvester Co.
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} p. 426

WITNESSES.
Daniel B. Reames,
W. E. Dicks.

INVENTORS.
G. W. Middlecoff
By his attorney
G. L. Chapin

1. The runners E E, constructed substantially as described, with the curved part extending from the front extremity to the rear of the line of the points of the teeth P P, for the purposes set forth.

2. Locating the post G, or its equivalent, back of the points of the teeth P P, substantially in the manner and for the purpose specified.

3. The construction and arrangement of the rods or braces N O, with the handles and cross-bar I, and nuts *t t*, for the purpose of bracing the handles to the cross-bar I, substantially in the manner described.

FRANK WICKS.

Witnesses:

R. M. KELLY.
J. S. BOUGHTON.

427 UNITED STATES PATENT OFFICE.

G. W. MIDDLECOFF, of Atlanta, Illinois, assignor to himself and A. McR. Blain, of same place.

Letters Patent No. 89160, dated April 20, 1869.

Improvement in Horse-Rakes.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, G. W. Middlecoff, of Atlanta, in the county of Logan, and State of Illinois, have invented a new and useful improvement in "hay-gatherers;" and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing and letters marked thereon, making a part of this description, in which—

(Here follows diagram marked p. 426.)

Figure 1 is a perspective representation of my invention.

The present invention relates to an improvement in that class of farm implements which are used more especially for taking hay from windrows and cocks and drawing it to a stack, or other place, where it is to be stored, and its nature will be fully understood by the following detailed description.

h h, &c., represent the teeth of an ordinary hay-rake, which are securely bolted or fastened to the under side of cross-pieces A B.

At the head of the rake is a series of standards, *f f*, tenoned into the cross-piece B, and also into a cap, C, the end standards *f* being securely braced by means of pieces of small scantling, D, the lower ends of which are permanently fixed to the cross-piece A, hold the

cap C rigidly in place, as it is against any draught of hay; and the braces S being secured to the teeth *h h* and the cross-pieces A B, so strengthen the rake as to prevent the teeth from turning on the bolts with which they are held in place.

The devices for operating the rake consist of ropes L, fastened to the end teeth at N N, pass through metal loops K, and terminate in loops R; and ropes M, which are fastened to loops R, pass back through the loops K and are fastened to chains E, said chains being fastened to the end standards *f* by means of hooks J.

The object of this arrangement is properly to adjust the pitch of the teeth *h h*, &c., to the surface that they are being drawn over, and also to provide means for drawing the rake from under a draught of hay without straining the standards and loosening the braces D.

The dotted lines *x* represent the position of one of the ropes, when the rake is moved backward; and from this it will be seen that the ropes M exert their force in the same manner upon the braces D, as they do when the rake is moved forward, the loops K being the first points of resistance, and transferring the draught points to the ends of the cross-piece A, instead of the points N J, on the teeth and standards *f*, as when the rake is moved forward.

The loops K perform the additional function of holding the ropes M L in position relative to each other, and preventing hay from so disarranging them as to change the line of draught.

The operation is very simple, requiring only that a horse be hitched to each of the loops R, and the rake or gatherer be moved forward until a load of hay has been accumulated, after which it is drawn, with its load, to a stack, or place where the hay is to be stored.

During the act of filling the gatherer with hay, it is quite necessary to have the teeth *h* run close to the ground, but after it is loaded this is not the case, and to so change the line of draught as to prevent the teeth from catching, the chains E should be let out one or more links on the hooks J, as the case may require.

This adjustment may be also necessary when gathering hay on inclined places.

Having thus described my invention,

What I claim, and desire to secure by letters patent of the United States, is—

A hay-gatherer, consisting of the teeth *h*, cross-pieces A B, braces S D, standards *f*, and cap C, in combination with ropes M L, chains E, and loops K, as set forth.

G. W. MIDDLECOFF.

Witnesses:
A. McR. BLAIN.
BENJ. BEAN.

J. Hudson.

Horse Rake.

No. 94,889. Patented, Sep. 14. 1869.

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Fig. 1

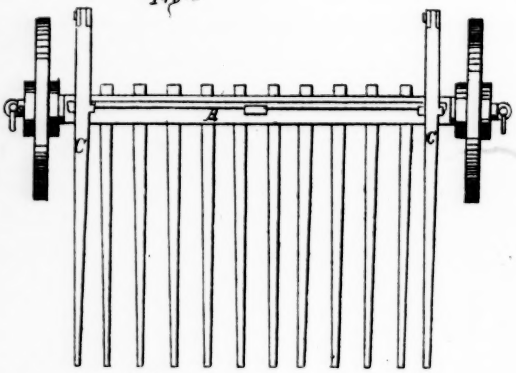
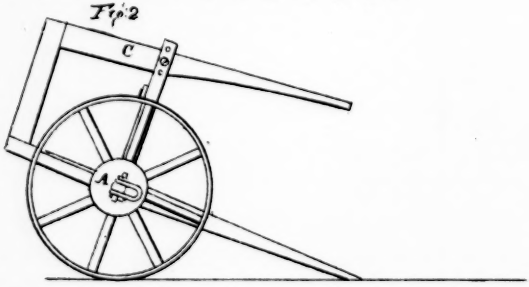


Fig. 2



Witnesses
J. A. Hurdle
Chopold Everd

Inventor
Jesse Hudson
Per Alexander Thomson
Attys

429 UNITED STATES PATENT OFFICE.

JESSE HUDSON, of Charleston, Illinois.

Letters Patent No. 94889, dated September 14, 1869.

Improvement in Horse-Rakes.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Jesse Hudson, of Charleston, in the county of Coles, and in the State of Illinois, have invented new and useful improvements in hay-rakes; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanping drawings, and to the letters of reference marked thereon.

(Here follows diagram marked p. 428.)

The object of my invention is to provide a hay-rake much larger than those of the ordinary make and size, and yet shall be so simple in its construction that they can be just as easily managed as the small ones.

Figure 1 is a plan view of my rake.

Figure 2 is a side elevation of the same.

As far as the construction of the body of the rake is concerned, it is similar to those of the usual construction and shape, only, as this is more especially intended for work upon fields of immense size, or upon the prairies, the beam between the wheels is intended to vary from fifteen feet and upward, while the prongs are to be about eight feet in length.

The ends of the beam *a* are made to extend out beyond the driving-wheels, so as to attach the horses to them, one upon each side. For this purpose, these axles should be made of iron, and have a hole pierced through at each end, so that a link or staple can be bolted on, of sufficient size, so as to allow them to swing freely around the axle, in order that the rake can be drawn in either direction.

Extending upward from the beam *a*, there are three uprights, those two at the ends being used for levers upon which the two arms C are secured.

These two outer uprights have a deep slot cut in their tops, large enough to receive the arms C, and, in order to adjust these arms to the height of the rider, a number of holes have been made in their sides, one above the other, so that the arms can be adjusted, by means of a bolt passing through, at any desired height.

Extending across these three uprights, there is a bar placed, which not only gives greater strength to them, but also prevents the hay from slipping back over the prongs.

By means of the two arms the prongs can be lifted up from the ground, so as to clear any obstruction in front of them. The two outside prongs are longer than the other ones, and are made to extend backward through the beam *a*, as seen in Fig. 2. To these two ends there are secured upright posts, slotted upon their tops, and in which the ends of the arms are pivoted.

It is intended to attach a horse to each end of the beam, and a rider upon each horse, so as to raise the prongs by means of the arms, whenever they catch in any obstructions. As soon as the rake is loaded, the drivers turn their horses about, and draw it backward, leaving the hay all in a pile, when they are again ready to go forward.

Having thus described my invention,

What I claim, and desire to secure by letters patent, is—

1. The arms C C, so arranged as to operate the prongs of the hay-rake over obstructions, substantially as set forth.

2. The combination of the elongated axle A with the projecting tines, and the pivoted arms C C, all substantially as set forth.

In testimony that I claim the foregoing, I have hereunto set my hand, this 17th day of March, 1869.

JESSE HUDSON.

Witnesses:

LAFAYETTE CRAIG.

LEOPOLD EVERT.

432 UNITED STATES PATENT OFFICE.

SAMUEL PATTON, of Chatsworth, Illinois, assignor to himself, John M. Long, and Robert Allstatter, of Hamilton, Ohio.

Improvement in Combined Corn Harvester and Husker.

Specification forming part of Letters Patent No. 103,362, dated May 24, 1870.

To all whom it may concern:

Be it known that I, Samuel Patton, of Chatsworth, in the county of Livingston and State of Illinois, have invented a new and improved corn harvester and husker; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

(Here follow diagrams marked pp. 430 & 431.)

Figure 1 is a sectional elevation; Fig. 2, a plan view; Fig. 3, a rear elevation; and Fig. 4, a detached section through the husking rollers.

This invention relates to a machine constructed for husking a row of corn as it stands in the field as fast as a span of horses will walk.

2 Sheets. Sheet 1.

S. Patton,
Corn Harvester.

No. 103,362. Patented May 24, 1870.

No. 345.
Acme Hay Harvester Co. v. Martin et al. } p. 430

fig. 1.

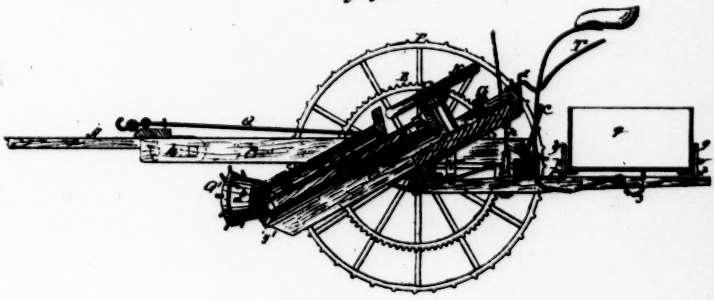
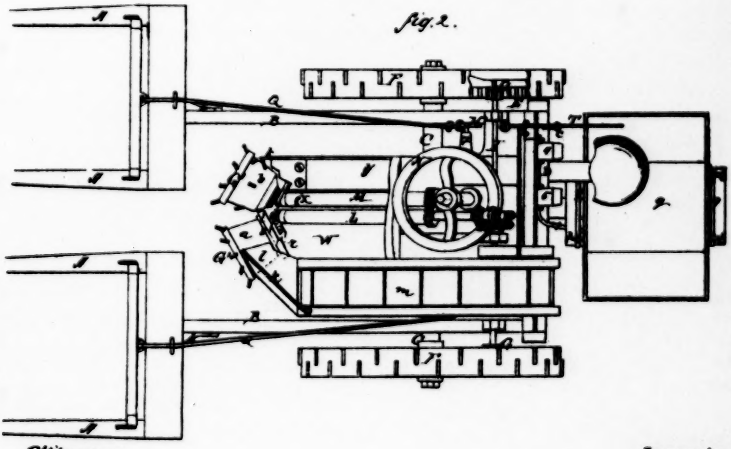


fig. 2.



Witnesses:
Victor Hagemann
L. C. Pettit

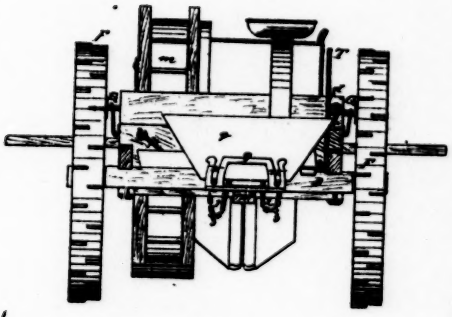
Inventor:
S. Patton
per Munn & Co
Attorneys.

2 Sheets. Sheet 2.

S. Patton,
Corn Harvester.

No. 103362 Patented. May 24. 1870

fig. 3.



No. 345.
Acme Hay
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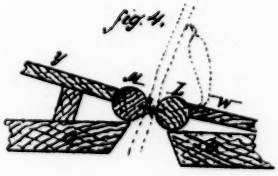
} p. 431

fig. 4.



Witnesses:
Victor Hagmann
C. A. Pettit

Inventor:
S. Patton
[illegible] & Co.
Attorneys.

The invention consists in a variety of devices adapted to discharge these functions, as hereinafter more fully appears.

In the drawings, A A are pairs of thills, attached to the front ends of spring-bars B B by means of adjustable joints *h h*, and arranged so as to pass at each side of the row, so as to allow the horses to work in front of the machine without breaking down the stalks.

The adjustable joints *h h* allow the height of the husking mechanism to be regulated by raising or lowering the front ends of the spring-bars B B and the rear ends of the thills A A.

The bars B B vibrate sidewise, allowing the horses all the freedom of motion necessary, yet being stiff enough to enable them to direct the course of the machine in the most perfect manner, they being bolted fast to the axle-tree C and braced by a frame-work behind it; and by being thus attached to and in rear of the axle and passing forward between the wheels and pivoted frame, the point of attachment of the thills is brought near the drums and rollers, and at the same time the full advantage of the long spring-bar is obtained.

The draft-rods Q Q are placed over the spring-bars B B, for the purpose of enabling the draft to counterbalance the weight on the rear part of the machine.

The rods Q Q pass through and slide in eyes on the cross-bars of the thills A A, and terminate in hooks or equivalent devices for receiving the whiffletrees, to which the horses are attached, while the rear ends of the rods are attached to the levers H H, by which a backward draft is brought upon the evener 7. The levers H H, in conjunction with the evener 7, prevent the horses from pulling unequally. The levers H H are attached to the spring-bars B B, back of the axle-tree C, by means of pivot-bolts. The levers are provided with orifices at their lower ends, that receive pins projecting from the ends of the evener 7, while their upper ends are each pierced with a series of perforations to receive the hooks on the rear ends of the draft-rods Q Q, by means of which perforations the rods may be raised or lowered for the purpose of regulating the amount of draft used to counterbalance the weight on the rear of the machine.

The frame O, to which the husking mechanism is attached, is pivoted to the axle-tree C by means of the hinges R R, which are placed out of line with the centers of the draft-wheels F F, so as to enable the machine to be thrown in or out of gear by changing the inclination of the frame O, which is done by raising or depressing the lever T, thus throwing the pinions G G into or out of contact with the toothed rims E E, whether the toothed rims be provided with inside or outside gear. When the frame O is thrown into position for husking, the pinions G G are prevented from engaging too deeply with the toothed rims E E by means of the chains *p p*, which are fastened to the cross-bar of the frame O near its outer ends, and also at or near the center of the frame-work beneath such cross-bar.

When the lever T is depressed it is held in that position by the hook *c* and spring *d*, and the machine moves forward without imparting motion to the husking mechanism, the front end of the frame O being raised out of the way of any obstructions that are ordinarily met with while traveling over rough ground, the lever T

being in a convenient position to be operated by the driver while sitting in the seat.

The frame O has a cross-bar framed on its rear end for the purpose of giving support to the shaft I, and is re-enforced on its upper side to prevent springing, and is greatly stiffened by a rib extending across its rear end, a plate extending across its upper side, 433 and the plate *f* on the under side, the front edge of which plate *f* is bent down, forming the rib P immediately behind the axle C, which rib is also of great service in stiffening the frame O, and its projecting ends are jointed to the axle C, thus allowing the frame O to vibrate vertically.

The draft-wheels F F run loose on the axle C, and are provided with toothed rims E E. When the frame O is thrown in position for husking, the toothed rims E E engage with the pinions G G on the shaft I. The pinions are placed on clutches that are keyed fast to the shaft I, and give motion to the husking mechanism by means of the bevel-wheel K, that is also keyed fast to the shaft I.

The husking-rollers L M are geared together, and receive motion from the bevel-wheel K, an elongation of the roller L being provided with a bevel-pinion for that purpose, while a bevel-wheel on the rear end of the roller M gives motion to the balance-wheel N. The hub of the balance-wheel N terminates on the under side in a bevel-pinion and forms a sleeve, which receives a shaft that is firmly fastened to the frame O, and furnishes a bearing for the upper end of the roller M. The balance-wheel N runs loose on this shaft, and receives motion from the roller M by means of the bevel-pinion referred to, the balance-wheel being in a convenient position and operating directly on the husking-rollers.

For the purpose of preventing hanging ears of corn from entering between the husking-rollers point foremost, the husking-roller M is sufficiently elevated above its fellow to incline the stalks of corn to one side, thus causing the points of hanging ears to strike on the board W, while the downward motion of the stalks, as they pass between the husking-rollers, brings the butts of the ears against the rollers in the proper position, and inclines the ears so that they fall over toward the elevator *m* when husked.

The elevation of the roller M above the roller L renders the use of an additional roller or other device for a similar purpose unnecessary, and thus simplifies the machine. If one roller were placed directly over the other, the stalks of corn would be prevented from entering between the two at their front ends.

The board W is placed by the side of the roller L for the purpose of preventing ears of corn from hanging so far over the roller as to be snapped off by the rapid downward motion of the stalks while passing between the rollers L M, and also, in conjunction with the board Y, to prevent ears of corn from falling to the ground when husked.

The manner of removing the ear of corn from the husk is substantially the same as that for which letters patent were granted to me bearing date August 18, 1868, and numbered 81,202.

The toothed and flanged drum *a* and the toothed drum *b* are

arranged forward of the husking-rollers, and work on journals or axles placed at obtuse angles with such rollers.

The office of the drums is to collect the stalks of corn and pass them in between the husking-rollers at regular intervals. For this purpose a notched flange, *i*, is placed on the rear of the drum *a*, and works so close to the rear end of the drum *b* as to prevent stalks of corn from passing between the drums, except when taken in by the notches of the flange. The notches are not large enough to admit more than one stalk of corn at a time, and they consequently pass the stalks in between the husking-rollers L M at regular intervals, while the flange *i* turns the stock backward at an acute angle with the rollers L M, in which position they pass between the rollers, and thus continually make room for other stalks to enter. The rear edge of the flange *i* is provided with the projecting points *r*, for the purpose of conveying ears of corn that may chance to fall on the husking-rollers away therefrom over toward the elevator *m*.

The roller M is provided, near its forward end, with the cam *x*, for the purpose of preventing ears of corn that may chance to fall on the husking-rollers from being caught and shelled by the ribs *n* on the rollers L M.

The cam throws the ears over against the flange *i*, the projecting points *r* of which carry them over toward the elevator *m*, thus keeping the rollers clear for the entrance of stalks. This cam may be fixed, as shown, or allowed to spring back against the roller, to which it is attached, by the pressure of the stalks as they pass.

The front ends of the rollers L M are provided with bevel-pinions, for the purpose of imparting motion to the gathering-drums *a b*, by engaging with teeth on the rear ends of the same. To prevent stalks of corn or refuse matter from collecting on the pinions and journals of the forward ends of the husking-rollers, the guard *y'* project upward from the frame or bearing-plates beneath the rollers and enter grooves at the rear ends of the pinions referred to.

The front ends of the gathering-drums *a b* are provided with the rims G' G', whose function it is to raise the stalks of corn or refuse matter taken up by their teeth sufficiently to prevent them from being caught by the points of the guards *k k*. The apron *l* is placed over the gathering-drum *a* for the purpose of preventing the accumulation of stalks or refuse matter behind the drum *a*, which might otherwise be carried thither by the notches in the flange *i*. The apron also prevents ears of corn from escaping at the front end of the machine when husked, while the rim 8 beneath the flange *i* is used for the purpose of raising stalks and refuse matter to prevent them from being caught on the edge of said flange. The axles of the gathering-drums *a b* are placed at obtuse angles with the husking-rollers, and diverge from each other, their front ends being farthest apart. The forward ends of the gathering-drums *a b* are provided with teeth that project outward and forward, for the purpose of gathering in the stalks of corn, while teeth farther back on the drum *b* assist in carrying the stalks backward, and also hold them from escaping until they are passed

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between the husking-rollers by the notches in the flange *i* on the drum *a*.

Stalks of corn that are leaning generally have to be moved farther than those standing upright, and consequently have to be moved quicker, in order to get them into the husking-rollers in time. The gathering-drums *a b*, being inclined slightly upward, draw the standing stalks of corn backward as gradually as if it were done by a screw, while stalks that are leaning are raised and carried back more quickly. The gathering-drums *a b*, being arranged in this position, take hold of stalks in any position in which they may be found and pass them in between the husking-rollers, one after another, at regular intervals and in the proper manner, their position being such that the more a stalk leans the more quickly it will be moved.

The ears of corn, when husked, are conveyed by the elevator *m* to the box *q*, which rests on two sets of pivots, in order that it may retain a horizontal position while being filled, and yet be dumped either to the right or left, as required. Its sides are beveled to facilitate the escape of the corn in dumping.

To enable the corn-box *q* to be dumped either to the right or left without displacing it, the plates 9 9 in front of and behind it are provided with the curved slats *w*. The pivots *t* of the dumping-box *q* operate in these slats, the lower end of which furnish the pivots with bearings.

There are two pedals, 4 and 5, within convenient distance of the driver's seat, which is bolted fast to the cross-bar D, the latter also giving support to the bearings of the rod 1. The rod 1 passes through and works loose in the left pedal 5, but is made fast to the right pedal 4, and is moved by it. The rod 1 is bent backward at its left end beneath the bottom of the dumping-box *q*, on the left side of the latter, and is connected therewith by one of the chains 3 or its equivalent. The left pedal is provided with the rod 2, which is made fast to it, and, passing beneath the bottom of the dumping-box *q* on its right side, is connected therewith by means of one of the chains 3 or its equivalent.

The driver, while sitting in the seat, operates the dumping-box *q* with his feet by means of the pedals 4 and 5, on which they rest. The toe of his right foot, being pressed down on the front end of the right pedal 4, moves the rod 1, which, pressing up against the bottom of the box *q* on the left side, causes it to tip over, emptying the corn on the right side of the row that is being husked. He then presses his heel on the rear end of the same pedal, causing the chain 3 to pull the box back to a horizontal position. The left pedal 5, being worked by the driver's left foot, operates in a similar manner, dumping the corn on the left side of the row.

This arrangement enables the driver, while working back and forth on the same side of the field, to always keep the space clear of corn between the row he is husking and the one next to be husked, thus preventing the piles of husked corn from being trampled under foot while husking the next row.

If, instead of dumping the corn in piles, it should be desirable to

convey it directly to a wagon, a carrier may be attached to the upper end of the elevator *m*, and extend outward beyond the draft-wheel F. This carrier may receive motion from bevel-gear on the upper shaft of the elevator *m*, and may be attached or removed at pleasure.

It is sometimes desirable to snap the ears of corn from the stalks without removing the husk from them. For the purpose of arranging this machine so that it will do the work in this manner, the relative position of the ribs *n* on the rollers L M is changed, so that they will strike the butts of the ears of corn alternately instead of closing on them simultaneously, as they do when husking. By this arrangement of the ribs the stem of the ear is broken off lower down, removing only the outside husk therefrom, while all of the husk that is of any value for mechanical or other purposes is left on the ear, and may be afterward removed and used without resorting to the tedious operation of assorting.

To provide a convenient method of changing the relative position of the ribs *n n* on the rollers L M, the journal on the rear end of the roller L works in the bearing 6, which is provided with a shank that, passing through a slot in the frame O, holds the bearing 6 in its proper position by means of a screw and nut or nuts on the under side of the frame O.

When it is desirable to change the relative position of the ribs *n n* on the rollers L M, the nut or nuts on the lower end of the bearing 6 are unscrewed, and the bearing is moved backward, thus freeing it from the journal on the rear end of the roller L, and allowing the roller L to be moved out of gear with the roller N, when, the rollers being turned so that the ribs *n* come in the desired position, the roller L is replaced in gear with the roller M, and, the journal on its rear end being replaced in bearing 6, the latter is screwed fast to the frame O by means of the nut or nuts on its lower end, thus providing a convenient and quick method of changing the operation from husking to snapping the ears of corn, and vice versa.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The combination of a pair of thills, A A, with each spring-bar B, arranged in relation to the frame O, in the manner and for the purpose specified.

435 2. The combination of the vertically-adjustable draft-rods 2 2, evener 7, and levers H, when the latter are pivoted to the spring-bars B in rear of the axle, for the purpose of enabling the draft to balance weight on the rear of the machine, substantially as described.

3. The arrangement of the plate *f*, having the rib P and joints R, with the frame O and axle C, all being constructed and operating substantially as described.

4. The drums *a* and *b*, when constructed as described and arranged forward of the husking-rollers, for the purpose specified.

5. The notched flange *i* on the rear of the drum *a* for the purpose specified.

6. The projections or points *r* on the rear of the flange *i*, for the purpose specified.

7. The cam X, attached to the roller M near its front end and radially in front of the rib *n*, for the purpose of preventing ears of corn from being caught by the ribs.

8. The guards *y'*, combined with the pinions on the rollers L M, as and for the purpose specified.

9. The rims G' G' on the front ends of the drums *a b*, when used in connection with the guards *k*, for the purpose specified.

10. The apron *l*, in connection with the drum *a*, having the rim 8, for the purpose specified.

11. The arrangement of the axles of the drums *a* and *b* at obtuse angles with the husking-rollers, as specified.

12. The arrangement of the corn-box *q*, plates 9, rods 1 and 2, and pedals 4 and 5, constructed and operating substantially as described.

SAMUEL PATTON.

Witnesses:
NATHAN K. ELLSWORTH.
CHAS. A. PETTIT.

437 120,688.

UNITED STATES PATENT OFFICE.

JOHN H. WHITNEY, of Rochester, Minnesota, assignor to himself and W. W. Marsh, of Sycamore, Illinois.

Improvement in Corn-Harvesters.

Specification forming part of Letters Patent No. 120,688, dated November 7, 1871.

To all whom it may concern:

Be it known that I, John H. Whitney, of Rochester, in the county of Olmsted and State of Minnesota, have invented certain improvements in machines for harvesting corn, of which the following is a specification, reference being had to the accompanying drawing.

(Here follows diagram marked p. 436.)

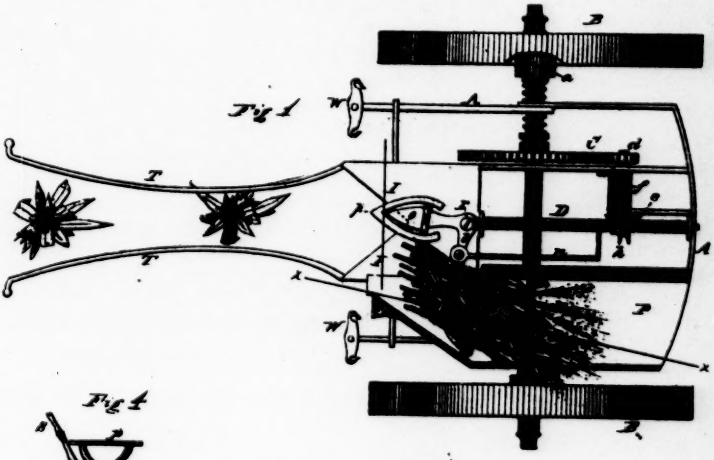
My invention relates to machines for cutting corn in the field, and the invention consists in a novel construction of the machine as a whole, and of the embodiment therein of several new features, as hereinafter more fully explained.

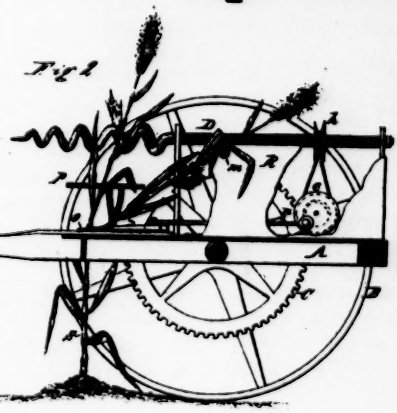
Figure 1 is a top plan view, and Fig. 2 is a longitudinal vertical section on the line *x x* of Fig. 1. Fig. 3 is a view of a part detached. Fig. 4 represents the operation of bending and cutting the stalk.

In constructing my machine I provide a suitable frame, A, and mount it on two wheels, B, one or both of which are fastened to the axle by means of a spring-clutch, *a*, as shown in Fig. 1, and as is customary in reaping-machines. To enable the machine to be drawn by a team and permit the team to straddle a row of standing corn, instead of the ordinary tongue I provide it with a tongue com-

J.H.WHITNEY. 436

No. 120,688. *Corn Stalk Cutter.* Patented Nov. 7, 1871.





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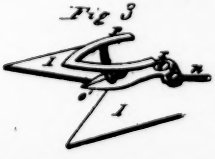

Witnesses.
Harry King
Phil. T. Dodge

Inventor.
John H. Whitney
by Dodge & Munn
Attys.

posed of two separate bars, T, placed at some little distance apart, with their front ends more widely separated, as represented in Fig. 1, thus leaving an uninterrupted space for the stalks back to the cutter. Upon the front of the frame, at each side, is secured a whiffletree, W, for attaching the team, as represented. Upon the central front part of the frame I secure a metallic plate, I, having its front cut in the form of a letter V, with its open or wide part to the front; and directly in rear of the apex of this notch I pivot a knife or cutting-blade, *o*, of the form shown in Fig. 1, the point of the knife projecting some distance out into or over the V-shaped notch. This knife has an arm, *l*, to which is connected a rod or pitman, *n*, which is operated by a crank or wrist-pin on a wheel, *e*, attached to a transverse shaft, *f*, which has on its opposite end a pinion, *d*, which is driven by a gear-wheel, *c*, secured upon the axle, as shown in Fig. 1, this mechanism imparting to the knife *o* a rapid oscillating motion on its pivot *r*. Attached to the knife, but at some distance above it, is a guard, *p*, of a form similar to that of the knife, but of considerably greater width, as represented in Fig. 1, the object of which will be hereinafter explained. In suitable bearings over the knife is mounted a longitudinal shaft, D, which has on it a pulley, *h*, connected by a belt to the pulley *e* on shaft *f*, by which means this shaft D is rotated. The front end of this shaft D is twisted like a cork-screw, as represented in Fig. 2. Upon one or both sides of the frame is secured a platform, P, with a vertical partition, R, running lengthwise of the machine, and with a raised ledge or box around the side, for receiving the stalks as they are cut. Across the platform, and resting on the raised side, is a cross-bar, *m*, on which the stalks rest as they fall, thus holding them in an inclined position convenient for binding.

The operation of the machine is as follows: The team being hitched to the machine it is drawn along in such a manner as to straddle a row of the stalks as they stand in the field. The revolving shaft D draws the top of the stalk backward toward the knife, and as the latter approaches it the guard *p*, striking the stalk in advance of the knife, because of its greater width, bends the stalk over sidewise, as represented in Fig. 4, against the edge of the plate I, thus presenting it in a bent or inclined position to the edge of the knife, which is thereby enabled to cut it on a slant, and of course to cut it with much greater ease. The stalks as cut fall upon the platform, resting in an inclined position on the bar *m*, where they are bound and thrown upon the ground, the binding-bands being held in a suitable receptacle.

It is obvious that the plate I, instead of being made wholly of metal, may be of wood, with a metal strip secured along its inclined edges; and these inclined edges may also be made sharp to assist in cutting the stalks as they are pressed against them. Both these and the knife may be provided with sickle-teeth or be made smooth, as preferred.

Two seats for binders may be mounted on the frame, one on each side, so that as the corn falls alternately on each side and the other of the machine it can be bound by the respective binders.

By these means I am enabled to construct a very efficient machine.

Having thus described my invention, what I claim is—

1. The combination of the reciprocating guard *p* with the knife *o*, when arranged to operate as described, whereby the stalks are
438 bent so as to enable the knife to cut them on a slant, as set forth.

2. The arrangement of the screw-shaft D, knife *o* with its guard *p*, and the cutter-bars I, all as herein described.

3. The within-described corn-harvester, consisting of a frame mounted on wheels, with the tongue composed of the two bars T, with the inclined cutter-bars I at their rear end, in combination with the oscillating knife *o* and guard *p*, all constructed and arranged to operate substantially as set forth.

JOHN H. WHITNEY.

Witnesses:
R. L. DIVINE.
J. L. PRATT.

441 UNITED STATES PATENT OFFICE.

JAMES CARROTHERS and WILLIAMSON CARROTHERS, of Newton, Iowa.

Improvement in Corn-Harvesters.

Specification forming part of Letters Patent No. 134,251, dated December 24, 1872.

To all whom it may concern:

Be it known that we, James Carrothers and Williamson Carrothers, of Newton, in the county of Jasper and in the State of Iowa, have invented certain new and useful improvements in corn-gatherers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of our invention consists in the construction and arrangement of a corn-gatherer, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

(Here follow diagrams marked pp. 439 & 440.)

Figure 1 is a side elevation; Fig. 2, a plan view; Fig. 3, a front view of our machine; and Figs. 4 and 5 are views of detached parts of the same.

The running-gear of our machine is substantially the same as

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2 Sheets--Sheet 1.

J. & W. CARROTHERS.

Corn-Harvesters.

No. 134,251. Patented Dec. 24. 1872.

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Fig. 1.

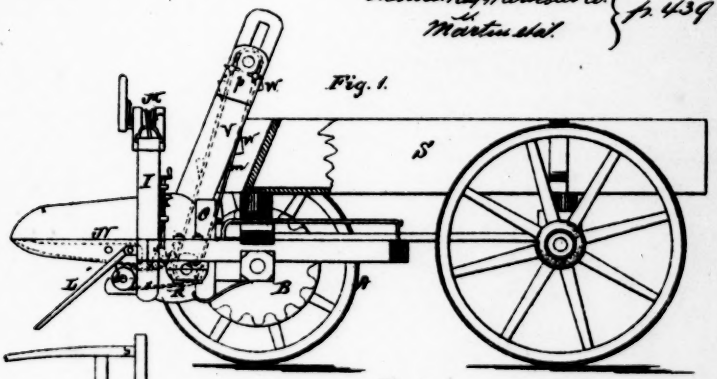
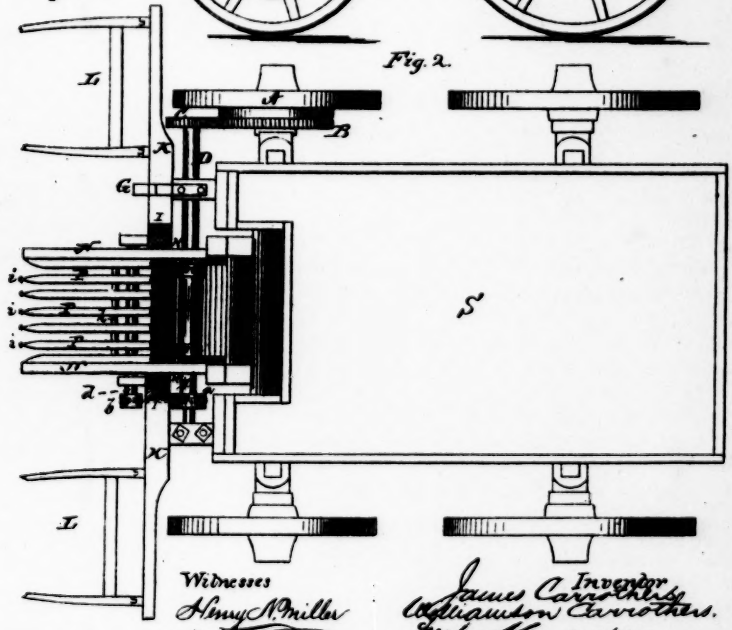


Fig. 2.



Witnesses
Henry N. Miller
C. L. Evert.

Inventor
James Carrothers
Williamson Carrothers.
per
Chandler & Mason
Attorneys

J. & W. CARROTHERS.

Corn-Harvesters.

No. 134,251. Patented Dec. 24, 1872.

Fig. 3.

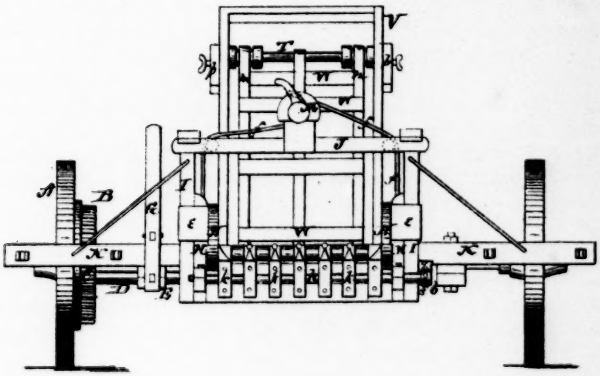
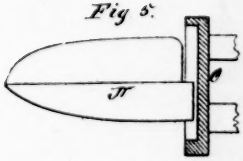


Fig. 4.

Fig 5.



No. 345.
Acorn Hay Elevator C. } p. 440
N. Martin et al

Witnesses
Henry N. Miller
A. L. Avery.

Inventor
James Carrothers
Williamson Carrothers.
per Alexander Mason
Attorneys.

that of any ordinary wagon, and therefore needs no description. To the inner side of one of the front wheels A is attached a cog-wheel, B, which gears with a pinion, C, on a shaft, D, running in front of and parallel with the front axle. The end of the shaft D upon which the pinion C is placed rests in a sliding box, E, operated by a lever, G, whereby this end of said shaft is moved back and forth, so as to throw the pinion C in and out of gear with the cog-wheel B. On the other end of the shaft D is a pulley, *a*, from which a belt or chain connects with a pulley, *b*, on a shaft, *d*, which has its bearings in boxes attached to the front sides of upright sliding bars H H. These bars are placed in grooves on the inner sides of upright standards I I, the upper ends of which are connected by a cross-bar, J, and which standards are firmly secured to the inner ends of horizontal beams K K running parallel with the front axle, and attached to the front ends of the front hounds, as shown. To each of the beams K is attached a pair of shafts, L, thus giving one horse in front of each wheel, with the gathering attachment between them. A metal band or socket, *e*, is attached to each sliding bar H, and passes around the grooved standard I to hold the bar to the same. The sliding bars H H are raised and lowered at will, and held at any desired height by means of a belt or chain, *f*, which is wound around a windlass, M, on the center of the cross-bar J, and the ends of which pass over pulleys in the ends of said cross-bar, and are attached to the sliding bars. On the inner side of each bar H is attached a shoe or divider, N, the inner or rear end of which fits and moves in a grooved post, O, of the frame, as shown in Fig. 5, when the sliding bars H H are moved up or down. Through the dividers N N in front of the shaft *d* passes a shaft, *h*, upon which are pivoted a series of knives or gatherers, P P, held a suitable distance apart by washers on the shaft. The knives or gatherers P P are constructed in the form substantially as shown in Fig. 4, their front ends being curved upward and running to a point, and in the point is inserted a round-headed pin, *i*, so as to prevent the point from running into the corn-stalks. The upper side of each knife or gatherer P is hollowed so as to form a sharp cutting-edge on each side of the same. The rear end of each knife is attached to a box, *k*, placed on an eccentric portion of the shaft *d*, as shown in Fig. 4, by which means the knives receive a vibrating movement on their pivot or shaft *h* as the machine moves forward.

When the machine is in motion, the corn-stalks pass between the knives P P, and as the stalks are drawn under the machine said knives by their vibrating motion cut off the ears, which pass into a receptacle, R, at the rear end of the knives, from whence the ears are carried up by an elevator and dropped into the wagon-box S. The elevator consists simply of endless belts *m m* placed around pulleys *n n* on the main shaft D, and passing around pulleys on a shaft, T, in or near the upper end of an inclined frame, V, and to said belts are secured buckets W, which carry the ears up, and as they turn over the upper shaft T the ears drop into the box S. The upper shaft T is placed in adjustable journal-boxes *p p*, which are secured at any desired height on the sides of the frame V by set-

screws, so that the belts *m m* may be tightened when necessary. The height at which the knives P P are to work is regulated by
441½ the raising and lowering of the sliding bars H H, as above described, and to keep the chain or belt *s*, which connects the pulleys *a* and *b*, at all times in proper working order, we use a tightener, as shown in Fig. 1. This tightener consists of a screw-rod, *t*, passing through suitable projections on the standard I, and its lower end working as a swivel in an angular bar, *v*, having a friction-roller, *f*, at each end bearing on the belt.

Having thus fully described our invention, what we claim as new, and desire to secure by letters patent, is—

1. The combination of the knives P P, shafts *h d*, boxes *k k*, dividers N N, and bars H H, all constructed and arranged as described, and moved up and down in the grooved standards I I by means of the belt *f* and windlass M, substantially as and for the purposes herein set forth.

2. In combination with the gathering mechanism herein described, the elevator consisting of the main shaft D with pulleys *n n*, endless belts *m m* with buckets W W, and the shaft T resting in adjustable bearings *p p* on the frame V, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 10th day of August, 1872.

JAMES CARROTHERS.
WILLIAMSON CARROTHERS.

Witnesses:
ALMON HALL.
J. C. COOK.

443 UNITED STATES PATENT OFFICE.

JACOB H. BEAN, of Macon, Illinois.

Improvement in Horse Hay-Rakes.

Specification forming part of Letters Patent No. 140,671, dated July 8, 1873; application filed February 24, 1873.

To all whom it may concern:

Be it known that I, Jacob H. Bean, of Macon, Macon county, Illinois, have invented a new and useful hay-rake, of which the following is a specification:

The object of this invention is to provide a simple and efficient appliance, wherewith hay can be gathered from the field and deposited in a wagon or upon a stack; and my invention consists in a rake constructed with pivoted teeth, having limited play within mortises in the rake-head. The head has longitudinal arms, forming journals for ground-wheels, and projecting to afford means for attaching horses, one at each end. Rollers running in the ends of arms, fixed transversely in the rake-head, support the teeth at the

No. 345.
Acme Hay Harvester Co.
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Martin et al
} p. 4442

J. H. BEAN.

Horse Hay-Rakes.

No. 140,671. Patented July 8, 1873.

Fig. 1.

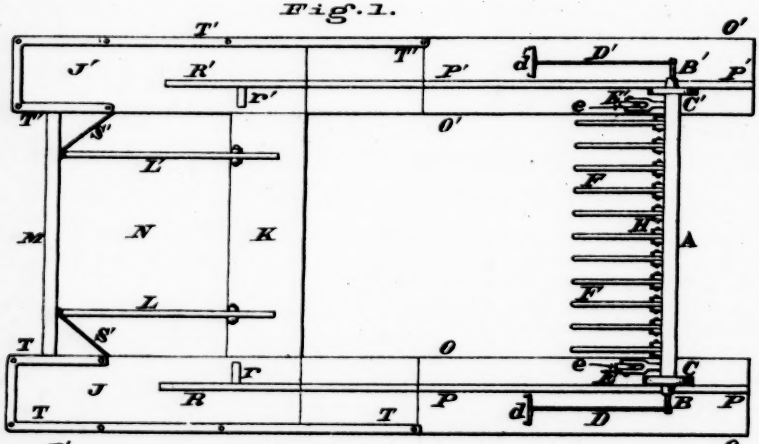


Fig. 2.

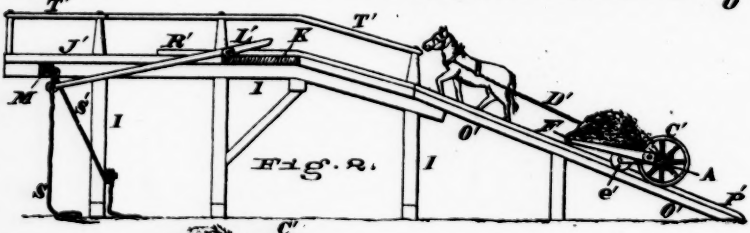


Fig. 3.

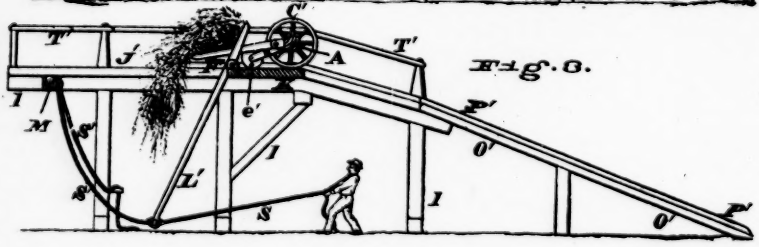
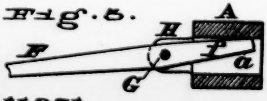


Fig. 4.

Fig. 5.



Witnesses.
Jas. H. Layman.
Walter Allen

J. H. Bean
By Hinkle & Co.
Attys.

proper inclination, and the whole apparatus is adapted for raking and gathering hay, and by means of inclined ways elevating it for discharge upon a mow or stack.

(Here follows diagram marked p. 442.)

Figure 1 is a plan of my hay-rake and elevator, the rake being represented in the act of ascending the inclined planes. Fig. 2 is a transverse section through the same, the swinging levers being represented in position for engaging under the load on the rake. Fig. 3 is a similar section, the rake being represented as having ascended the elevator, and the pivoted levers shown in the act of discharging the hay from the teeth of said rake. Fig. 4 is a perspective view of one end of the rake-head; and Fig. 5 is a transverse section through the rake-head on an enlarged scale.

The rake-head A consists of a stout beam, of any suitable length, and having gudgeons B B′ at its ends, upon which are journaled the ground-wheels C C′. The gudgeons B B′ project some distance beyond the hubs of the ground-wheels, so as to afford room for attachment of the ropes or chains D D′, to whose ends are secured the singletrees *d d′*. To these singletrees are hitched the animals. Projecting from the front side of the rake-head, and near the ground-wheels, are arms or brackets E E′, having journaled in them small roller *e e′*. These rollers, in conjunction with the wheels C C′, serve to maintain the rake-head in such a position as to render its teeth the most effective for gathering up the hay. The rake-teeth F are of the ordinary shape, but are secured to the head in a novel way, which greatly increases their efficiency. Instead of being rigidly secured to the head, they are united to the same by pivots G, which pass through them and engage with lugs or ears H, the latter being attached to the front side of said rake-head, as more clearly shown in Figs. 4 and 5. The rear ends *f* of the teeth occupy mortises or slots *a*, in the head, which mortises are large enough to permit considerable vertical movement of the teeth, whereby they are rendered self-adjusting, and are capable of yielding in passing over uneven ground.

The elevator which I employ, in conjunction with the above-described rake, is arranged as follows: I is a frame or staging, which supports two horizontal platforms, J J′, and these platforms are united by a beam or bridge, K, to which is pivoted one or more swinging levers L L′. M is a bar or brace, which connects the outer ends of the platforms J J′. N is an opening or hatch-way, between the platforms J J′, the bridge K, and brace M. Access is had to the platforms J J′ by means of inclines O O′, which extend from the front sides of said platforms down to the ground. These inclines should be so gradual as to permit the horses to draw the rake up them with ease and safety. Tracks or rails P P′ and R R′, laid respectively upon the inclines and platforms, confine the rake-head to a proper path as it ascends and descends the elevator. The platforms J J′ may, if preferred, be provided with stops *r r′*, for the purpose of arresting the rake at the proper position upon said plat-

forms. Ropes S S′, or equivalent appliances, may be employed for operating the disengaging-levers L L′. T T′ are railings, around the elevated platforms J J′.

The operation of my rake and elevator is as follows: The horses are first hitched to the singletrees *d d′*, and the implement is then drawn over the field until a sufficient load of hay has accumulated upon the teeth F of the rake. When this has been accomplished the rake is conducted to the elevator, and the horses driven up the inclines O O′, care being taken to have the ground wheels C C′ run inside the tracks P P′. After completing the ascent of said inclines the rake is drawn upon the platform J J′, and maintained in
444 a proper position upon the same by the rails R R′. The rake is drawn along these platforms until its head reaches the opening or hatch-way N, when its further progress is arrested by the stops *r r′*, or by checking the team. As the teeth of the rake pass over the hatch-way, the swinging levers L L′ are adjusted or are pressed by the advancing load to the position shown in Fig. 2; but as soon as the motion of the rake is arrested these levers are then turned by the attendant pulling the rope S, and caused to assume the vertical position represented in Fig. 3. In this position they engage with the load of hay, and the moment the rake is drawn back off of the platform said levers act to disengage the hay from the teeth, and cause it to fall through the opening or hatch-way N. When thus discharged the hay may be delivered into a wagon or deposited upon a stack. The rake being delivered of its load is then allowed to descend the inclines O O′, and is once more taken to the field and loaded, after which the previously-described operation is repeated, and continued as often as necessary. After as much hay has been deposited as to completely fill up the hatch-way or opening N, the entire elevating apparatus, including the staging, inclines, platforms, &c., is then shifted bodily along the ground, either to the right or left, so as to allow another deposit to be made alongside the previous one, and thus form a continuous rick or stack of hay.

Instead of being shifted to the right or left the elevator can be moved either backward or forward, so as to permit the hay being deposited in a rick or row parallel with the inclines O O′ and platform J J′.

It will be seen that my elevator is arranged in such a manner as to allow a wagon to be driven in under the hatch-way N, and to be loaded with hay by a few operations as the hay is moved in large masses, and by the power of steam or animals, and not by hand.

The elevating apparatus is not claimed in this application, and is only alluded to in order to make clear the mode of using the improved rake, to which the invention relates.

I claim as new and of my invention—

The combination of the head A, protecting-gudgeons B B′ ground-wheels C C′, hitching devices D D′ *d d′*, arms E E′, rollers *e e′*, pivoted teeth F *f* G H, and mortises *a*, for the purpose herein described.

J. RUMRILL.

Horse Hay-Rakes.

No. 152,174. Patented June 16, 1874.

No. 345 Acme Hay Harvester Co. vs. Martin et al. p. 445

Fig. 1.

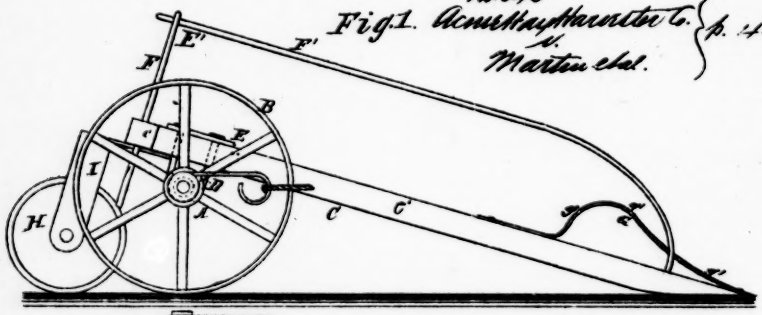
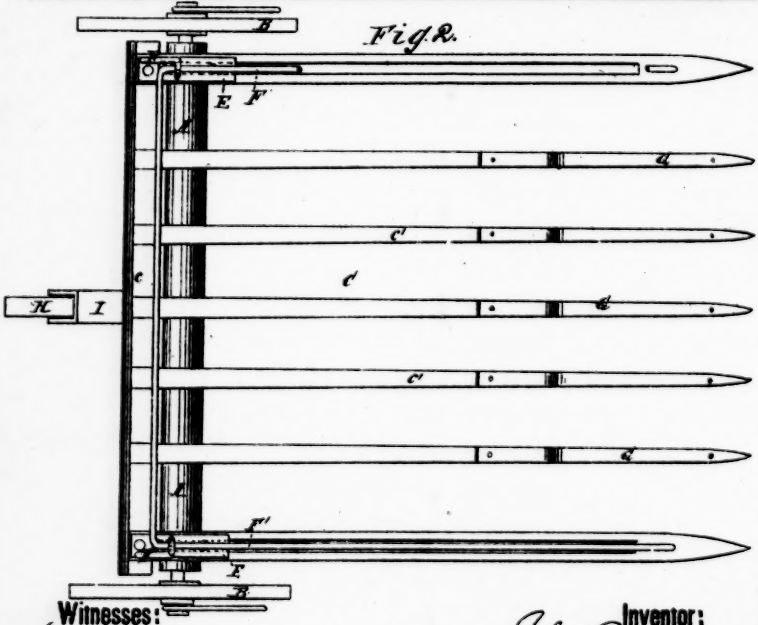


Fig. 2.



Witnesses:
G. Mattys.
Solon C. Kemon

Inventor:
John Rumrill
Per Munn & Co
Attorneys.

In testimony of which invention I hereunto set my hand.

JACOB H. BEAN.

Witnesses:

A. G. HARRIS.

J. S. RUBY.

446 UNITED STATES PATENT OFFICE.

JOHN RUMRILL, of Salina, Kansas.

Improvement in Horse Hay-Rakes.

Specification forming part of Letters Patent No. 152,174, dated June 16, 1874; application filed January 9, 1874.

To all whom it may concern:

Be it known that I, John Rumrill, of Salina, in the county of Saline and State of Kansas, have invented a new and improved hay-gatherer; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification, in which—

(Here follows diagram marked p. 445.)

Figure 1 is a side elevation. Fig 2 is a top view.

The invention relates to means whereby hay, after having been cured in windrow, may be raked and carried to the stack by one continuous operation, thereby greatly lessening the usual labor and the customary waste by hauling it, or by dragging it, with horses and circumjacent ropes or chains.

A represents an axle with wheels B B turning on the journals thereof, and C a rake having head *c* and teeth *c'*. The side teeth are slotted, and receive therethrough the yokes D D, which are held by plates E E, on the top of which plates their free ends are riveted. These yokes pass around the axle, that is grooved to receive them, or may be prevented from sliding thereon in any other way. E' is a wire, iron, or wooden frame, formed of standards F and rod, wire, or bent wood F'. The ends of the latter are gradually curved toward the front, and fastened to the forward ends of the side teeth of rake. G is a plate fastened near the end of each tooth, except the two side ones, having a sudden rise in the rear, *g*, but a gradual incline on the front, *g'*. The rake-teeth frame E' and plates G combine to hold the hay that has been raked up in its proper place on the combined horse-rake and hay-carrier. H is a third wheel, which may be journaled in a frame, I, that is pivoted to and beneath the middle of the rake-head. The axle being adjustable out toward the ends of the rake-teeth by means of the axle-yokes, (movable in the slots of the side teeth,) the three wheels are made to support the whole structure when the rake is not intended to gather the hay.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The combination, with a rake having wheel H journaled in a frame, I, that is pivoted to the rake-head, of the axle carrying the two main wheels, and adjustable under and toward the ends of the teeth, as and for the purpose described.

2. The combination of yoke D, plates E, and slotted side teeth of rake, as and for the purpose described.

JOHN RUMRILL.

Witnesses:
E. L. NORTON.
F. W. NORTON.

448 UNITED STATES PATENT OFFICE.

JAMES F. SWINNERTON, of Marion, Ohio.

Letters Patent No. 66186, dated June 25, 1867.

Improvement in Horse-Rakes.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, James F. Swinnerton, of Marion, in the county of Marion, and State of Ohio, have invented a new and useful improvement in hay-gatherer; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

(Here follows diagram marked p. 447.)

Figure 1 is a top view of my improved hay-gatherer.

Figure 2 is a vertical section of the same, taken through the line *x x*, Fig. 1.

Similar letters of reference indicate like parts.

My invention has for its object to furnish a machine for hauling and delivering hay at a stack, simple and durable in construction, easily operated, and which will take the hay from a windrow, rendering the labor of cocking it wholly unnecessary; and it consists of an improved hay-gatherer, constructed and arranged as hereinafter more fully described.

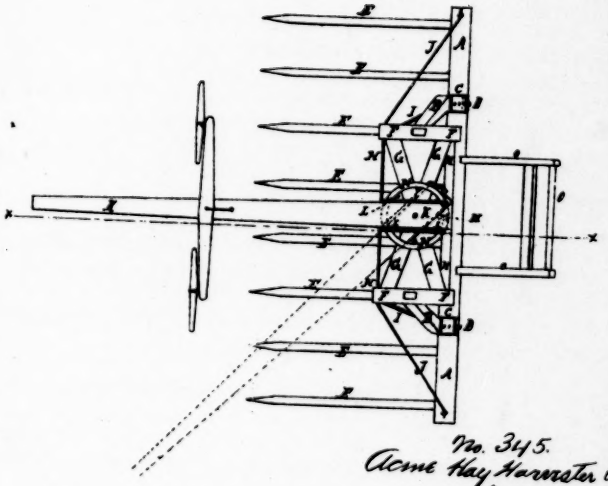
A is the shaft of the rake-head, which is secured to the lower ends of the standards B by metallic straps, C, passing around said shaft, and the ends of which are secured to the front and rear sides of said standards B, as shown in Fig. 2. D are stop-pins, which pass through slots in the metallic straps C, and are screwed or driven into said shaft A. These pins D allow the shaft A to turn upon its axis a sufficient distance to raise the teeth E, so that they will pass over

J. F. Swinnerton.

Horse-Rake.

No. 66186 Patented Jun, 25. 1867

Fig. 1.



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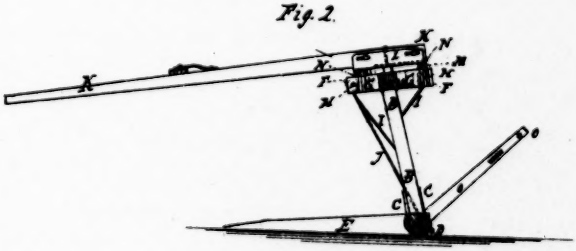
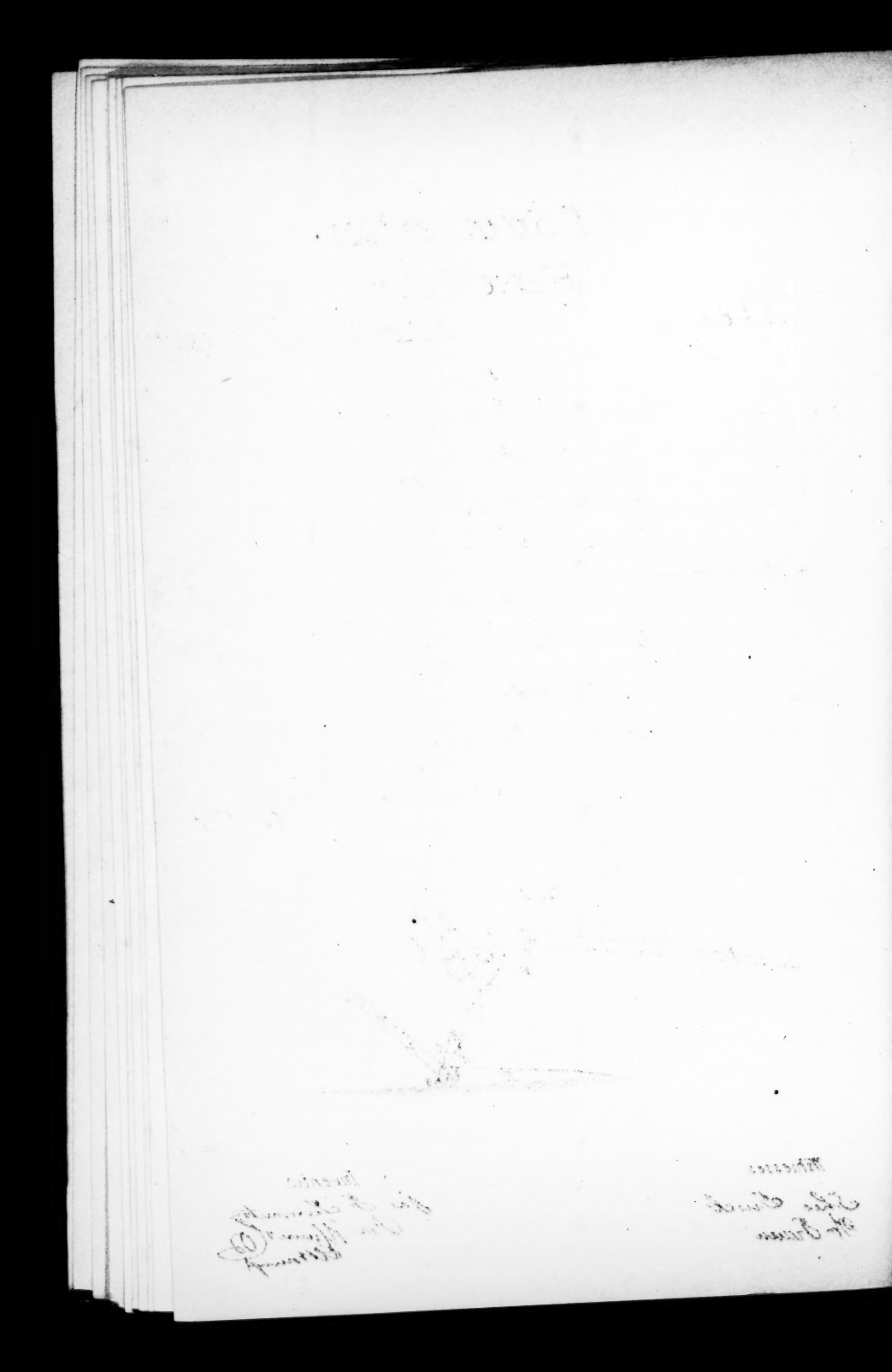
p. 447.

Fig. 2.



Witnesses.
Thos Tusch
Wm Freeman

Inventor.
Jas F. Swinnerton
Per Munn & Co
Attorneys



obstructions, but effectually prevent the rake-head from revolving. The teeth E are attached to the front side of the shaft A, and are made longer and stronger than ordinary rake-teeth. To the upper ends of the standards B are attached the end-bars F of the top or draught-frame. The alternate ends of the bars F are connected to each other by the diagonal bars G, which are framed into each other at their centres. H are metallic rods or braces, connecting the ends of the end-bars F to each other, and strengthening the frame. The frame F G is also strengthened by the metallic braces I, the upper ends of which are secured to the ends of the bars F, and their lower ends to the standards B, as shown in the drawings. The said frame F G is also strengthened by the metallic braces J, the upper ends of which are secured to the forward ends of the bars F, and their lower ends are pivoted to the upper side of the shaft A, near its ends, as shown in Fig. 1, to permit the partial rotation of said shaft in passing over obstructions. K is the tongue, which is made long, so that the horses may be attached to it so far in front as to be out of the way of the teeth E and of the hay collected upon them. The tongue K is pivoted to the centre of the frame F G by a pivoting-pin, the lower end of which enters a hole in the diagonal bars G, and its upper end is securely attached to the plate L. The sides of the plate L are turned up so as to embrace or form a socket for the tongue K, and it is secured to the said tongue by pins or bolts passing through the tongue and through slots in the said turned-up sides of the said plate or socket L. This construction allows the tongue K to have a slight longitudinal movement, to throw the hook M, which is securely attached to the under side of the rear end of the said tongue, out of and into a notch formed in the rear side of the metallic ring or circle N, which is securely attached to the diagonal bars G of the frame F G, and upon which the plate L slides as the tongue K is turned upon its pivoting-pin. It should be observed that the entire draught of the machine comes upon the hook M and upon the pivoting-pin jointly. O are handles attached to the rear side of the shaft A, by means of which the machine is steadied and controlled.

In using the machine the hay is collected upon the rake-head and drawn to the stack or other desired place; the horses are then backed a little, to throw the hook M out of the notch in the ring N. The horses are then turned one-half around and the machine drawn away from the hay. The horses are then turned back one-quarter around, and started forward, the driver at the same time stepping upon the end of the rake head nearest the horses. This brings the machine again into the proper position for collecting another load.

What I claim as new, and desire to secure by letters patent, is—

The combination of the plate or socket L, hook M, and ring N, with each other, and with the tongue K and frame F G, substantially as herein shown and described, and for the purpose set forth.

JAMES F. SWINNERTON.

Witnesses:

T. F. WALLACE.

E. G. ALLEN.

450 UNITED STATES PATENT OFFICE.

F. F. FOWLER, of Crane township, Wyandot county, Ohio.

Improvement in Machines for Gathering Hay.

Specification forming part of Letters Patent No. 31162, dated January 22, 1861; Reissue No. 1511, dated July 14, 1863.

To all whom it may concern:

Be it known that I, F. F. Fowler, of Crane township, in the county of Wyandot and State of Ohio, have invented certain new and useful improvements in machines for gathering hay; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

(Here follows diagram marked p. 449.)

Figure 1 represents a top plan of the hay-gatherer; and Fig. 2 represents a longitudinal vertical section of the same, taken at the red line *x x* of Fig. 1.

The object and purpose of this machine is to gather and transport to the stack or other depository the hay which has been previously raked into a windrow; and the invention consists, first, in uniting the runners and cross-bars by flexible joints, so that the machine may conform to the inequalities of the ground over which it is moving without raising the gathering and carrying fingers therefrom; and it further consists in so combining the fingers with the runners that a portion of the soles of the fingers shall act as supports in contact with the ground as the runners themselves do, both fingers and runners mutually supporting and carrying the load; and it further consists in the combination of a hinged tongue, a turning finger-bar, and the flexibly-connected runners, so constructed and arranged as that the front of the machine may be lowered on the curves or slopes of the runners, while its rear is raised up to allow the fingers to turn over and discharge their load.

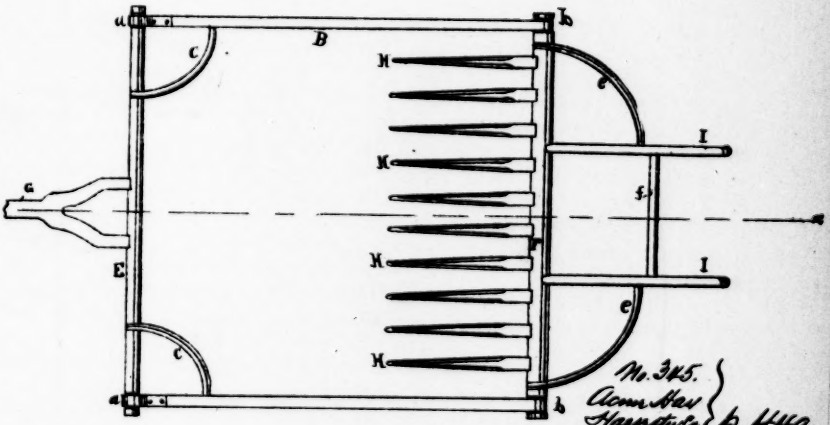
To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents the runners, of which there are two—one on each side of the machine. B are the runner-rails, braced to the runners A by braces C D, to give them the necessary strength and position in the machine. The runners and their frames or sides are united by the cross-pieces E F, the joints *a a* and *b b* or connections being so made as to prevent the runners or side pieces from spreading, but leaving each side piece or runner free to rise or fall without influencing the other as they accommodate themselves to the inequalities of the ground over which they may for the time being be passing. The cross-piece E, I use also as a tongue-bar for the tongue G, which is connected at its forward end to the necks of the horses or team,

F. F. Fowler,
Horse Rake.

No 1511. Reissued July 14, 1863.

Fig. 1.



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Harvester Co.
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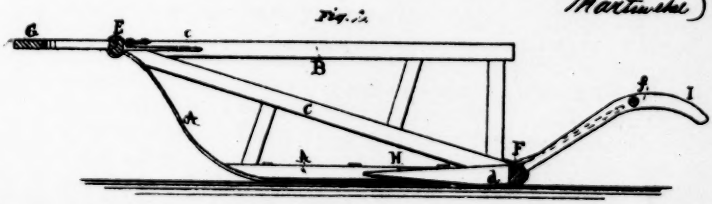
Fig. 2.



and the cross-piece, being hung like a tongue-roller, allows the front end of the machine to pitch downward on the curve of the runners when it becomes necessary to discharge the load of hay carried by the machine. The sides B may be braced to the cross-piece E by the curved braces *c*, one end of which may be fastened to the side piece and the other end be loosely attached to the cross-piece, so that they will neither prevent the cross-piece from rolling in its supports nor prevent the side pieces from rising or falling to such inequalities in the ground as are usually encountered in meadows or grass-fields. The cross-bar F, I use as a finger-bar, it being hung low down to the heels of the runners by journals on which it can turn. To this bar F are united the fingers H, which are made with a portion of their soles, as at *d*, so that they will have a bearing and run steadily upon the ground. This bearing *d*, being on a plane with the soles of the runners, makes a bearing-surface throughout the width of the machine at its rear, which enables the fingers supported by the runners to carry their load without danger of being shaken or thrown off.

The handles I are united to the cross-bar F, and these handles may be braced by braces *e f*.

By running the machine along the windrow, with one runner on each side thereof, the fingers will load themselves with the hay, and when loaded the machine acts as a sled, by which the load may be drawn to the stack or other depository. When the hay is to be unloaded the operator, by means of the handles I, raises up the rear of the machine, the front by the same act descending until the fingers turn over and drop the load. If the team be in motion, this dumping or unloading is facilitated thereby, the machine passing from the hay. The quantity of hay that can be conveyed by this machine is very large, the sides, fingers, handles, and their braces serving as a cradle for containing it, and very much expedites the hauling and stacking of hay in the field.

451 Having thus fully described the nature and object of my invention, what I claim therein as new, and desire to secure by letters patent, is—

1. Connecting the sides and cross-pieces of the machine together by flexible or yielding joints, so that either side of the machine may rise or fall in yielding to the inequalities of the ground independent of the other side, substantially as described.

2. So constructing and combining the fingers with the runners as that the rear under portions of the fingers shall also act as runners and supporters, and mutually aid and be aided by the runners proper in carrying the load, substantially as described.

3. The combination of a hinged tongue, a turning finger-bar, and the flexibly-connected runners, so that as the machine is raised behind it may roll down in front on the curve of the runners for the purpose of dumping or discharging the load, substantially as herein described.

F. F. FOWLER.

Witnesses:
T. E. GRISEN.
E. R. WOOD.

453 UNITED STATES PATENT OFFICE.

W. T. NICHOLS, of Rutland, Vermont.

Letters Patent No. 75450, dated March 10, 1868.

Improvement in Hay-Rakers and Loaders.

The schedule referred to in these letters patent and making part of the same.

Be it known that I, W. T. Nichols, of Rutland, in the county of Rutland, and State of Vermont, have invented a new and useful improvement in "hay-rake wagons;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

(Here follows diagram marked p. 452.)

Figure I is a top view with the crank loading-frame.
Figure II is a side view with the crank loading-frame.
Figure III is a top view without the crank loading-frame.
Figure IV is a side view without the crank loading-frame.

a is the land driving-wheel of the loading-frame; *b* is the driving-pinion or gear attached to the land driving-wheel of the crank loading-frame; *c* is the pinion or gear attached to the crank-journal of the crank loading-frame; *d* is the crank of the loading-frame; *e* is the rock-shaft of the loading-frame; *f f f f f* are the bars of the crank loading-frame. *o o o o o o o* are upright teeth in the bars of the loading-frame; *i* is the connecting-frame, carrying the fore wheels and clapper *h*, and connecting with the rear part of the rake-wagon; *q q* are the elastic supplementary teeth, made of steel, as shown in Figs. I and II, and of wood, as shown in Figs. III and IV; *q' q'* are the main teeth of the rake, forming, with the supplementary ones, *q q*, the bottom of the rake, when used as a rake, and also the bottom of the wagon when used as a wagon; *h* is the clapper to support the bottom *q' q'* and *q q* above the ground when used as a wagon; *k* is the rear frame to keep the hay from sliding off the rear end; *l* is the brace-rod to hold the frame *k* in position; *m* is the tongue to which the draught is applied; *n n* are wheels set upon an axle, as shown in Figs. I and II, or between the teeth *q' q'*, as shown in Figs. III and IV; *p* is the lifting-lever under the bottom of the rake.

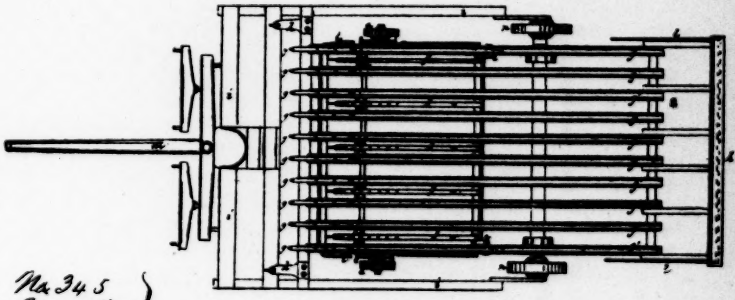
The drawings will show the method of construction better than words of description; but in general terms the rake is composed of teeth *q' q'*, about seventeen feet long, five inches wide, by one inch thick, set upon their edges, and held together by a sufficient number of stays, either by rods passing through them, and blocks of wood between each tooth, as shown in Fig. I, or by flat pieces bolted upon the bottom edges, as shown in Fig. III. At the front end of these

W. T. Nichols.

Hay-Raker & Loader.

No. 75450 Patented Mar. 10, 1868

Fig. I.



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Marhu et al.
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Fig. II.

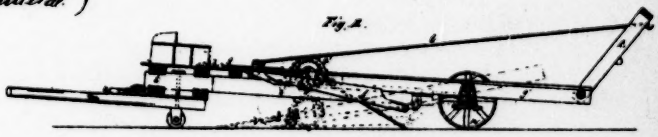

Fig. III.

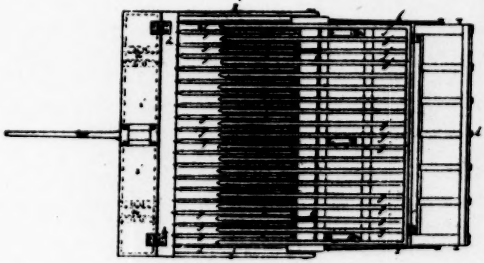

Fig. IV.

Witnesses:
Geoffrey Wealthy
Martin Tennis

Inventor
W. T. Nichols

teeth q' q' are the elastic or supplementary teeth, q q, properly fastened, as shown in the drawings, and when made of steel should be applied or attached upon the ends of the teeth, q' q', as shown in Fig. I, and when made of wood, should be fastened between the teeth q' q', as shown in Fig. III.

When a wide rake is desired, say twenty feet in width, and for use upon level surfaces, the rake may be constructed as shown in Fig. III, with wooden supplementary elastic teeth placed between the main teeth, and with two wheels, say ten to fifteen inches in diameter, placed between the main teeth with short axles, as shown, the method allowing the use of several wheels, with no large or heavy axle to sustain them.

Upon rough or hilly surfaces, a rake of the width above mentioned will be found to be impracticable, and hence a rake, say ten feet wide by twenty feet long, would be more desirable; and for the purpose of getting more hay upon it than would naturally slide upon it with larger wheels, the crank loading-frame may be attached. The land driving-wheel of said frame carries with it the pinion attached to it, which gears into the pinion upon the end of the crank-shaft, and hence gives the cranks a rotary motion in the opposite direction to the movement of the rake. These cranks carry one end of the loading-frame bars, while the other ends of said bars are carried by the rock-shaft e; hence as the cranks revolve these bars are brought above the upper edges of the teeth, upon which the hay rests, the upright teeth o o o o stick into the hay, and by the further revolution of the cranks, the hay is carried backward upon the teeth, while the next revolution repeats the same operation.

The elastic supplementary teeth are used so that as the load accumulates upon them, they will come flat upon the ground, and leave the stubble sticking up between them, and the friction of the hay against the stubble will cause it to slide backwards upon the rake.

When the rake is sufficiently loaded, the driver backs up his team, and the lever p sticks into the ground and raises the forward end of the rake above the clapper h, when the clapper falls, and the forward end of the rake rests upon it, which loads the hay and converts the rake into a wagon, and the forward motion of the team relieves the lever p from the ground, and the load is ready to be drawn to its place of destination.

454 This improvement is in addition to and is designed to be used in connection with a hay-rake wagon, of which letters patent were granted to me, this 28th day of January, 1868—No. 73747.

What I claim, and desire to secure by letters patent, is—

1. The combination of the gathering and loading-rake q' q', &c., and the supplementary elastic teeth q q, substantially as and for the purposes set forth and described.

2. The combination of the vibrating gathering-rake, and the auxiliary loading-frame f f, substantially as set forth and described.

3. Driving the auxiliary loading-frame f by the carrying-wheels a, or their equivalent, said wheels being attached to and vibrating with the gathering-frame q' q', substantially as set forth.

4. The combination of the land-wheel, *a*, pinions *b* and *c*, cranks *d*, and rock-shaft *e*, substantially as and for the purpose set forth.

5. The small wheels *n n*, located between the teeth *q' q'*, and having their bearing attached to said teeth, substantially as set forth.

6. The connecting-frame *i i i*, attached to rake-frame, as and for the purposes set forth and described.

W. T. NICHOLS.

Witnesses:

R. W. FENWICH.
W. READ.

456 UNITED STATES PATENT OFFICE.

JOSEPH DAIN, Jr., of Kansas City, Missouri.

Horse Hay-Rake.

Specification forming part of Letters Patent No. 288,314, dated November 13, 1883. Application filed April 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, Joseph Dain, Jr., a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful hay rake or gatherer, of which the following is a specification, reference being had to the accompanying drawings.

(Here follows diagram marked p. 455.)

This invention relates to hay rakes or gatherers; and it consists in certain improvements in the construction of the same, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, figure 1 is a plan view, Fig. 2 is a side view, and Fig. 3 is a longitudinal vertical sectional view, of my improved hay rake or gatherer.

The same letters refer to the same parts in all the figures.

A in the drawings designates the body of my improved rake, which consists of teeth B B, connected by cross-bars C and D on their under sides, said cross-bars being placed, respectively, at and near the rear ends of the teeth, which are in this manner firmly connected. Several of the teeth are also provided with blocks E on their upper sides, at their rear ends, which said blocks are connected by cross bar or brace F. This general construction is not absolutely essential to the successful operation of my invention, and changes with respect to this may be made without departing from the spirit of my invention.

G is a truck, consisting, mainly, of an axle, H, mounted upon transporting-wheels I I, and having a short tongue, J, connected

(No Model.) 455

J. DAIN, Jr.

HORSE HAY RAKE.

No. 288,314. Patented Nov. 13, 1883.

Fig. 1.

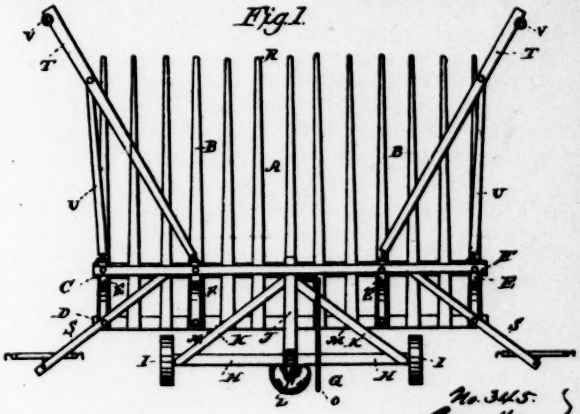

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Fig. 2.

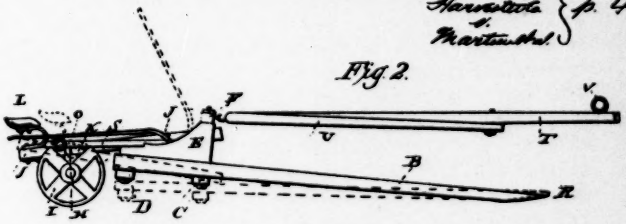
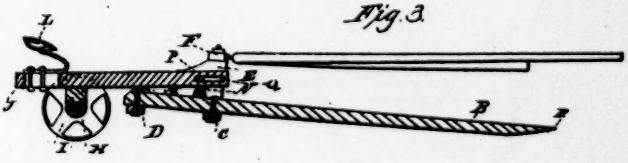


Fig. 3.



Joseph Dain, Jr.
INVENTOR

WITNESSES
Chas. R. Burr
Geo. H. Harvey

By C. A. Brown & Co.
Attorneys.

with the axle by diagonal braces K K. The tongue also forms the seat-bar, upon which the driver's seat L is mounted. The truck G is connected to the body of the rake by hinges M M, which connect the rear end of the rake with the under sides of the diagonal braces K.

N is a rock-shaft, which is journaled transversely upon the rake-head, and provided at one end with an operating handle or lever, O, convenient to the driver, and at the other end with a crank, P, working in a slot, Q, formed horizontally in the front end of the tongue. By this arrangement it will be seen that the rake may be manipulated so as to raise or lower its rear end, which is supported and held off the ground by the truck.

The front ends of the rake-teeth, which rest upon the ground, are beveled on their under sides, so that the points R shall, under all circumstances, be raised some distance above the ground. By raising or lowering the rear end of the rake the points will, at the same time, be raised or lowered, thus adapting the device to even or uneven ground, as the case may be.

To the upper side of the rear end of the rake-head, at both sides of the latter, are secured diagonally outward and rearward extending beams S S, to the outer ends of which the horses are hitched. T T are beams or bars hooked or hinged to the cross bar or brace F, at some distance from the ends of the latter. U U are braces pivotally connected to the beams T T, and hooked or otherwise connected to the ends of the cross-bar F, as shown. The outer ends of the beams T T are provided with loops V V, to receive the holdback-straps.

The operation of my improved rake will be readily understood. The draft is easy and readily controlled, and admits of the rake being backed from under its load with great facility.

I claim as my invention and desire to secure by letters patent of the United States—

1. In a rake of the class described, the forwardly and outwardly projecting hinged beams, forming tongues for the said rake, as set forth.

2. In a horse-rake of the class described, the forwardly and outwardly projecting hinged beams, forming tongues for the said rake, in combination with braces hinged to the said rake and connected pivotally to the tongues, as set forth.

3. In a horse-rake of the class described, the combination, with the transverse bar or brace, of the forwardly and outwardly extending hinged tongues and braces, and the rearwardly and outwardly extending hitching-beams, as set forth.

4. The combination of the rake, a rock-shaft mounted
457 transversely upon the latter, and having an operating-lever and a crank, a truck having a short tongue provided with a slot at its front end to receive the crank of the rock-shaft, diagonal braces connecting the tongue with the axle of the truck, and hinges connecting the said diagonal braces with the rear end or head of the rake, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOSEPH DAIN, JR.

Witnesses:
A. G. TRUMBULL.
O. S. RICHARDS.

459 UNITED STATES PATENT OFFICE.

C. RUNDELL, of Chicago, Illinois.

Improvement in Hay and Straw Stackers.

Specification forming part of Letters Patent No. 54213, dated April 24, 1866.

To all whom it may concern:

Be it known that I, C. Rundell, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in hay, grain, and straw stacking machines; and I do hereby declare that the following is a full and complete description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

(Here follows diagram marked p. 458.)

Figure 1 is a view of the stacker; Fig. 2, a top view of the same; Fig. 3, a view of detached section.

Like letters refer to like parts in the several views presented.

A, Fig. 1, is an upright standard of wood, the lower end of which terminates in a point. B is a step in which the point of the standard sets and turns. C is a collar surrounding the joint D, and by the means of which the upper end of the standard is connected to the head E. This joint permits the standard to turn independently of the head, and is made as follows: The lower end of the head is fitted into the upper end of the standard in the manner indicated by the dotted line F, forming thereby a pivoted joint, the head being held permanently by the guy-ropes G H I, Figs. 2 and 3. The guys are connected to the head of the stacker by the rings J J′. The other ends are fastened to the ground by the rings K K′, or by any other suitable means. These guys are for the purpose of holding the standard in an upright position while in use.

L is a spiral blade or screw. M is a revolving reel, and constructed in the following manner: *a* is a thimble and constitutes the head of the reel. Projecting from the side of the thimble are the shoulders *b*, between which the arms of the reel are placed and secured by a wire passing through the end of them, a hole being provided for that purpose, as will hereinafter be shown.

The arms of the reel are constructed in two separate parts, the end *c* being made of iron or any other suitable material, and is in the

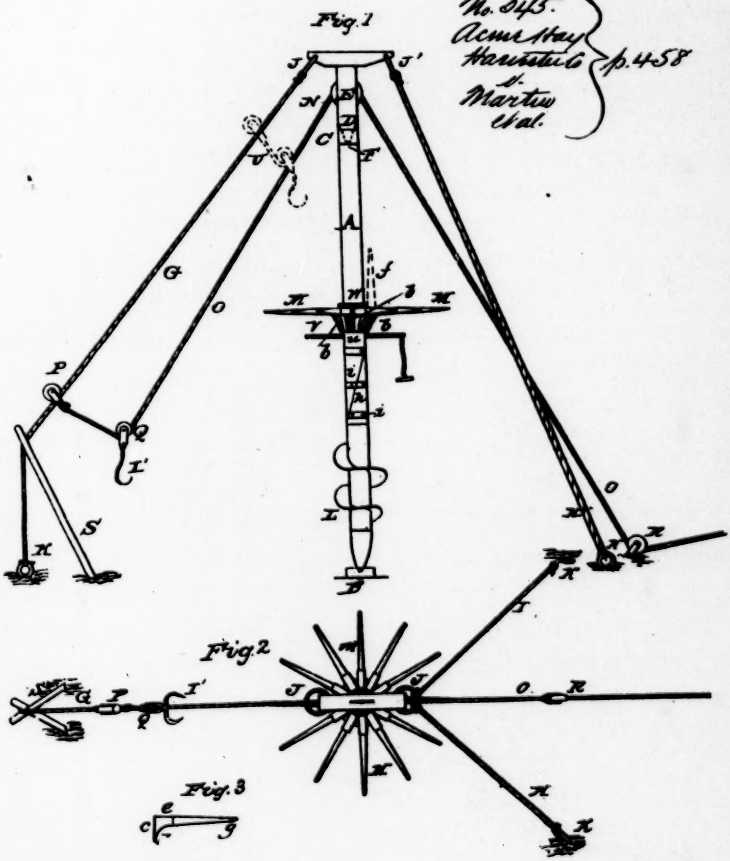
Defendants Exhibit Rundell Patent "A. H. A" N. P.

C. RUNDELL.

Hay Stacker.

No. 54,213. Patented April 24, 1866.

No. 345. Acme Hay Harvester Co. v. Martin et al. } p. 458



WITNESSES
W. H. Burridge
Frank Alden

INVENTOR
C. Rundell

form of a socket. By means of the foot *d*, projecting downward and resting against the side of the thimble or head of the reel, they are kept in a horizontal position, as shown in Fig. 1; also, by the wire passing through the hole *e*, Fig. 3, as above stated, permits of the arms being turned upward against the sides of the standard, as indicated by the dotted lines *f*. The purpose of this will hereinafter be described.

The outer ends of the arms *g*, Fig. 3, are made of wood, and fitted into the socket-section of the arm above described.

N, Fig. 1, is a sheave. O is a run-rope, one end of which is fastened to the movable pulley P, thence passing under the pulely Q, thence over the sheaves N, down to and under the pulley R. The purpose of this rope will be shown hereinafter.

S is a cross-truss or brace for the purpose of raising the guy up out of the way, in order to give more room between the guy and the standard.

Having thus described the several parts of the stacker, we will now proceed to explain its operation, which is as follows:

The standard, on being erected where it is desired to build the stack, the load of grain, or other material to be stacked, is then driven between the truss and standard. The pulley P and the pulley Q, to which the horse-fork T is hung, are then brought down and take the grain or hay from the load or ground, as the case may be. It is then carried up by the several pulley and run-rope, above described, in the direction of the dotted pulley U above the reel, upon which it is dropped by tripping the fork in the usual way. When the hay is deposited upon the reel it is then carried around to any side of the mow where it may be wanted, and is then raked off by the hands engaged upon the stack, to be spread and placed about as desired.

In order to accommodate the reel to the increasing height of the stack, it can be raised up by turning the standard by means of the lever V in the direction of the drift of the spiral blade or screw, the under side of which, as it turns, presses down upon the hay, and thereby causes the standard and also the reel to rise upward, the guys being loosened at the ground for this purpose. In this way the standard and reel can be raised to any height it may be desired to build the mow.

On finishing the stack the standard can then be removed by turning or screwing it out in the manner above described, leaving a hole from the top to the bottom of the mow, affording by this means a full and complete ventilation of the stack.

To facilitate the moving of the stacker from place to place, the reel can be closed up around the standard, as above mentioned. The ring W is then slipped down over the arms, and by this means they are held securely together. So, also, the lower part of the standard, around which the screw is placed, can be detached from the upper, the two parts being connected by the diagonal joint *h*, the bands *i* holding the two sections firmly together. When the standard is erect, by detaching the standard and folding up the arms of the

reel, the whole can be moved without much trouble or danger of breaking.

What I claim as my improvement, and wish to secure by letters patent, is—

1. The employment of the screw-elevator for the purpose of raising the frame or standard in the mow or stack in stacking hay, grain, or straw, in the manner substantially set forth.

2. The screw and standard, or its equivalent, when arranged and operated conjointly in the manner and for the purpose set forth.

3. The reel connected with the pole or standard, substantially and for the purpose specified.

4. The pulley, sheaves, and standard, with the run-cord and pulley, constructed so as to operate conjointly as and for the purpose herein described.

C. RUNDELL.

Witnesses:
W. H. BURRIDGE.
FRANK ALDEN.

461 DEFENDANTS' EXHIBIT WICKS PATENT. A. H. A., N. P.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Frank Wicks October 18th, 1864, number 44761, for improvement in hay-elevators or stack-builders.

In testimony whereof I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be [SEAL.] affixed this 12th day of April, in the year of our Lord one thousand eight hundred and eighty-six, and of the Independence of the United States the one hundred and tenth.

M. V. MONTGOMERY,
Commissioner.

462 & 463 No. 44761.

UNITED STATES OF AMERICA:

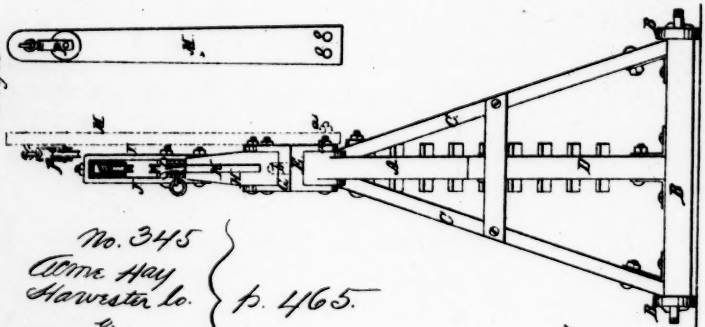
To all to whom these letters patent shall come:

Whereas Frank Wicks, of Kansas, Illinois, has alleged that he has invented a new and useful improvement in hay-elevators or stack-builders, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of

F. Wicks,

Derrick.

No. 44,761. Patented Oct. 18, 1864.



No. 345
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Harvester Co.
v.
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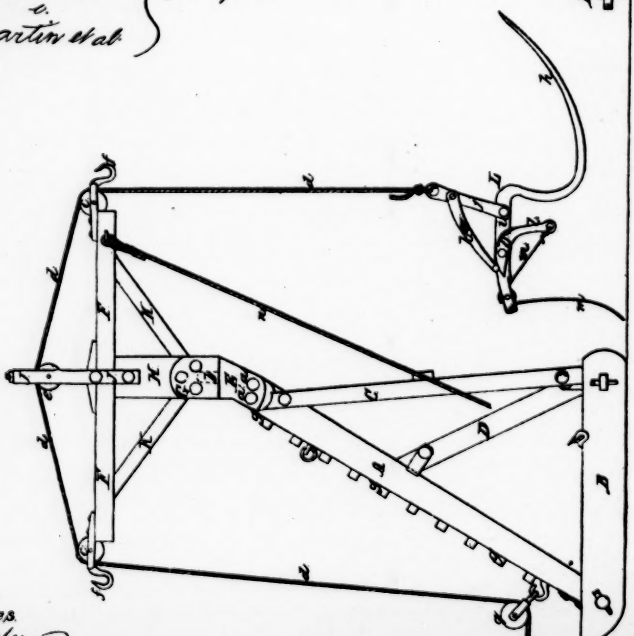


Witnesses.
N. W. Hilton
Jno. D. Patton

Inventor.
Frank Wicks
By atty. A. B. Stoughton

Patents signifying a desire of obtaining an exclusive property in the said improvement and praying that a patent may be granted for that purpose:

These are, therefore, to grant according to law to the said Frank Wicks, heirs, administrators, or assigns, for the term of seventeen years from the eighteenth day of October, one thousand eight hundred and sixty-four, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said improvement, a description whereof is given in the words of the said Frank Wicks in the schedule hereunto annexed and is made a part of these presents.

464 In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office has been [SEAL.] hereunto affixed.

Given under my hand, at the city of Washington, this eighteenth day of October, in the year of our Lord one thousand eight hundred and sixty-four, and of the Independence of the United States of America the eighty-ninth.

J. P. USHER,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

JOHN L. HAYES,
Acting Commissioner of Patents.

466 UNITED STATES PATENT OFFICE.

FRANK WICKS, of Kansas, Illinois.

Improvement in Hay Elevators or Stack Builders.

Specification forming part of Letters Patent No. 44761, dated October 18, 1864.

To all whom it may concern:

Be it known that I, Frank Wicks, of Kansas, in the county of Edgar and State of Illinois, have invented certain new and useful improvements in hay elevators or stack builders; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

(Here follows diagram marked p. 465.)

Figure 1 represents a side elevation of the contrivance. Fig. 2 represents an end elevation thereof.

Similar letters of reference, where they occur in the separate figures, denote like parts of the apparatus in both the drawings.

In the construction of these hay elevators or stack builders, besides the ordinary requirements of cheapness, portability, and

strength, there are other essentials quite as important to their general introduction—viz., that of being capable of coming up close to the stack that is being built, so that the swinging beam may not be so long or top-heavy as to topple over the elevator, and yet allow the hay to be easily placed on any part of the stack that is being built; secondly, the transferring of a portion of the weight from the ends toward the central support of the swinging beam, which admits of greater stability in the structure; thirdly, so constructing or arranging that the swinging beam may be readily taken down for transportation or stowage, and readily put up again by a single person with the aid of his team.

The nature of my invention consists in the combination of the permanent and braced inclined main beam and the movable vertical or upright beam, each furnished with metallic bearings or heads, for the purpose of making a firm structure, and a substantial turning support for the upper upon the lower beam, and for allowing the apparatus to come close up to the stack to be built.

It further consists in so constructing and rigging the hoisting-rope as that the weight and draft shall not come entirely upon the ends of the swinging beam, but a portion of it taken upon its central support to give it additional firmness and less liability to topple over.

It further consists in an auxiliary mast or post, that can be united to the lower structure to admit of the raising up or lowering of the swinging beam for transportation or stowage.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents the main supporting-beam, which is set upon the base B in an inclined position for the purpose of allowing the counter or strut braces C to stand nearly or quite perpendicular, as this side of the elevator stands next the stack that is to be built, and otherwise the braces C, if inclined, and the main beam, if perpendicular, would not admit of this close proximity of the apparatus to the stack. The braces C are spread at their lower ends to the extent of the width of the base B, so as also to brace laterally as well as vertically, and their upper ends are upon opposite sides of the main supporting-beam A, as shown in Fig. 2. Another brace, D, in a more inclined position, extends from the center of the rear portion of the base to the main beam A, as shown.

The above construction makes nearly a right-angled triangular frame, of which the main beam is the hypotenuse and the main brace the vertical side thereof. These parts are all united by metallic fastenings, which make them very rigid, and which admit of the whole being taken to pieces, to be stowed away when not required. On top of this angular frame there is a metallic head, E, firmly secured by through-bolts *a a*, passing through its sides or flanges and through the top of the main beam A, and a bolt or pin, *b*, in dotted lines, is set in or upon this head for the swinging beam F to turn upon. The swinging beam F is composed of, first, a metallic head, G, that has a hole for the pin *b* to enter, and which head

rests and turns upon the lower head, E; secondly, an upright, H, secured to the head G, a cross-beam, F, secured to the upright by a metallic yoke, J, that rises up considerably above the said cross-beam, and braces K for bracing the beam F to the upright H. This construction is clearly shown in the drawings.

At each end of the swinging beam F there is a pulley, *c*, over which the hoisting-rope *d* passes, and in the upper part of the yoke or metallic frame J that rises above the beam F there is a pulley, *e*, over which also the hoisting-rope passes. This elevated central
467 pulley, *e*, performs two functions: First, it brings a portion of the weight and draft upon the central support of the swinging beam, which makes said beam more firm on its support; and, secondly, it changes the position of the rope from a right to an obtuse angle with regard to the end pulleys, and correspondingly reducing the strain thereon. In addition to the pulleys at the ends of the swinging beam, I have arranged hooks *f*, to which anything may be fastened, if found necessary. On the main beam A, I have placed rungs *g*, for the purpose of ascending or descending the main beam to arrange the rigging, unship the swinging beam, or for any other purpose.

The elevating-fork L, composed of the tines *h*, shank *i*, link *j*, brace *k*, and trigger *l*, and cord *m* to operate it, is fastened to one end of the hoisting-rope *d*, and the team is fastened to the other end of it. *n* is a guy-rope for swinging the beam F with.

When the machine is to be taken down for any purpose, I have so arranged that one person may readily do it, as follows: M is a light post, having two holes, *o o*, through its base, that will fit over the set-screws *a a* in the metallic head E, and when the nuts of these screws are run up against this post it will have the position shown in red lines in Fig. 2. On this post M there is a block, *p*, through which a line may be reeved, and one end of it fastened to the swinging beam and the other end passed through the pulley *q*, and a horse or the team hitched thereto. The swinging beam can be raised up above the pin *b*, swung a little to one side, and then lowered to the ground. This done, the post M may be taken down, the other parts all disconnected by removing the metallic fastenings, and the whole snugly piled or stowed away or transported to any other place.

The base B is made in the form of sled-runners for easily moving the apparatus from stack to stack or from place to place by the team or otherwise, and when the machine is in use hooked or shouldered stakes may be driven down alongside of the base to hold it firmly to the ground, if found necessary; but the frame will stand very firm without them.

The metallic head G may be flanged like that E, to make a stronger union between it and the upright H, and the flanges may be on all four sides, or socket-like, to take the strain more from the bolts.

Having thus fully described the object and purpose of my invention, what I claim therein as new is—

1. The combination of the permanent and braced inclined main beam A, and the movable vertical or upright beam H, furnished,

respectively, with metallic bearings or heads E G, for the purpose of making a firm structure and a substantial turning support for the upper upon the lower beam, and for allowing the apparatus to come close up to the stack to be built, substantially as described.

2. In connection with the swinging beam and its end pulleys, *c*, the metallic frame J and its pulley *e*, above said beam, for the purpose of bringing a portion of the strain more directly to the center of the beam and to ease off the angle at which the rope would otherwise pass the pulleys *c c*, substantially as described.

3. The auxiliary post M, made to be united to the head E, for the purpose of enabling the user to place or displace and lower the swinging beam when the apparatus is to be moved away or taken down, substantially as described.

FRANK WICKS.

Witnesses:
WASHINGTON STEPLETON.
JAMES BARRETT.

469 UNITED STATES PATENT OFFICE.

BENJ. M. TOWNSEND, of Quincy, Illinois.

Improvement in Machines for Raking and Loading Hay.

Specification forming part of Letters Patent No. 7277, dated April 9, 1850.

To all whom it may concern:

Be it known that I, Benjamin M. Townsend, of Quincy, in the county of Adams and State of Illinois, have invented a new and useful machine for raking and loading hay, &c., of which the following is a full, clear, and exact description, reference being made to the accompanying drawing, forming part of this specification, which represents a perspective view of my raker.

(Here follows diagram marked p. 468.)

The nature of my invention consists in combining a toothed rake, by which the hay is gathered, with elevating-bands, which take the hay from the rake-teeth and elevate it into the body of a hay-wagon connected with the raker.

In the drawing, A is the frame of the machine. It is quadrangular, and is supported on three wheels, *a a a'*, two of which, *a a*, run on the opposite ends of an axle extending transversely across the frame. The third wheel, *a'*, is hinged by an arm to the hinder cross-bar of the frame, so that it can move like the roller of a furniture-caster when the machine is turned.

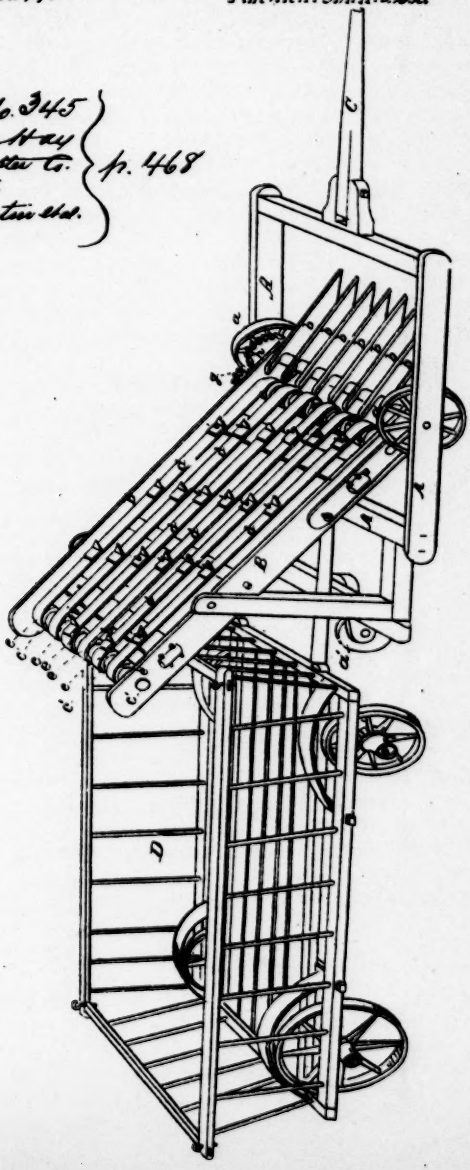
The rake-teeth *b b b* are hinged to the front of the machine, either on the axle of the front wheels or in any other suitable manner, and project forward to gather the hay.

B. M. Townsend.

Hay Loader.

No. 7277. Patented March 26, 1850.

No. 3445 Acme Hay Harvester Co. v. Martin et al. } p. 468



An inclined frame, B, is erected on the main frame A of the raker to support the elevating-bands. This frame, at its front end, extends below the upper surface of the rake-teeth, and rises, as it recedes from them, until its hinder extremity is sufficiently high to discharge the hay into the wagon-body. A horizontal shaft, *c*, extends transversely across the lower part of the frame, and a corresponding horizontal shaft, *c'*, crosses its upper extremity. Each of these is furnished with pulleys *e e e*, over which the elevating-bands *d d d* are strained. The pulleys correspond with the spaces between the rake-teeth, and the bands are furnished with suitable projecting teeth, *i*, or bars, to give them a better hold upon the hay. The lower horizontal shaft, *c*, has a cog-wheel, *g*, mounted upon one of its extremities, which gears into a corresponding cog-wheel, *h*, attached to one of the running-wheels *a*, so that the bands are driven and the hay elevated by the progressive motion of the machine.

The horses are attached to a pole, C, projecting in front of the machine, and the hay-wagon D is connected with the frame of the raker by its pole, so that it follows to receive the hay from the elevating-bands.

The raker and wagon thus connected and arranged are drawn forward, and the hay collected by the rake-teeth is rapidly elevated and discharged into the wagon-body, thus saving the labor expended in pitching the hay upon it, and requiring only the same number of hands as the common horse-rake for raking alone. When the wagon is filled it is disconnected from the raker and an empty one substituted in its place.

A series of narrow elevating-bands are superior to a single broad belt, as they travel independently of each other, and do away with the loss of power caused by the slipping and straining of a broad band whose drums are not exactly of equal diameter through their whole length. They also possess the additional advantage of entering between the rake-teeth, so that no space need be left between their hinder extremities and the revolving bands.

What I claim as my invention, and desire to secure by letters patent, is—

The simultaneous raking and loading of hay from the ground by machinery, substantially as herein set forth, whereby the labor of making windrows and cocking, as in the usual process of hay-making, is saved, at the same time that the operation is both expedited and cheapened.

In testimony whereof I have hereunto affixed my name this 6th day of October, A. D. 1849.

B. M. TOWNSEND.

Witnesses:

WM. D. WASHINGTON.

S. W. WOOD.

471 UNITED STATES PATENT OFFICE.

JOHN P. HUNTER, of Williamsport, Indiana.

Letters Patent No. 66679, dated July 16, 1867.

Improvement in Horse-Rakes.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, John P. Hunter, of Williamsport, in the county of Warren, and State of Indiana, have invented a new and valuable improvement in horse hay-rakes; and I do declare the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

(Here follows diagram marked p. 470.)

Figure 1 is a perspective view, and

Figure 2 is a vertical longitudinal section.

In both figures I employ the same letters in the indication of identical parts.

This rake is intended to be used for gathering the cut grass, as it is drawn by at least two horses across the meadow, and carrying it directly to the stack.

A is the rake-head, to which are attached the teeth B, projecting at a slight downward angle, which pass under and gather the cut grass which is collected, resting against a vertical or inclined framework formed by the beam C placed parallel to the head A, and connected therewith by braces D. E is a sled, formed of two runners turned up at both ends, and united by suitable braces. The rake-head A is carried upon one end of said sled, to which it is attached by straps I passing around rounded journals cut in the head. F is a handle attached to the rake-head and inclined backwards, the cross-piece thereof resting upon the upper end of the standard G, which is sustained upon the elastic spring-board H, crossing the sled and attached thereto. The elasticity of this spring-board is intended to maintain the teeth in their proper relation to the surface of the meadow, under variations in the level of the same.

The horses are intended to be attached to the head, at each end, by a rope fastened to the staples K. The horses may thus, by simply turning around, be made to draw the rake, following the sled when not at work, or in the direction of the projecting teeth when at work. When the load is drawn to the stack, the horses are turned to the opposite side, and the sled and rake following it drawn to the point from which the work of gathering is to be commenced.

What I claim as my invention, and desire to secure by letters patent, is—

J. P. HUNTER.

Horse Rake.

No. 66,679. Patented July 16, 1867.

470

No. 345
Acme Hay
Harvester Co.
v.
Martin et al.
p. 470

Fig. 2.

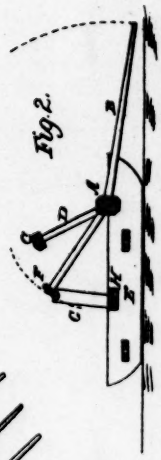
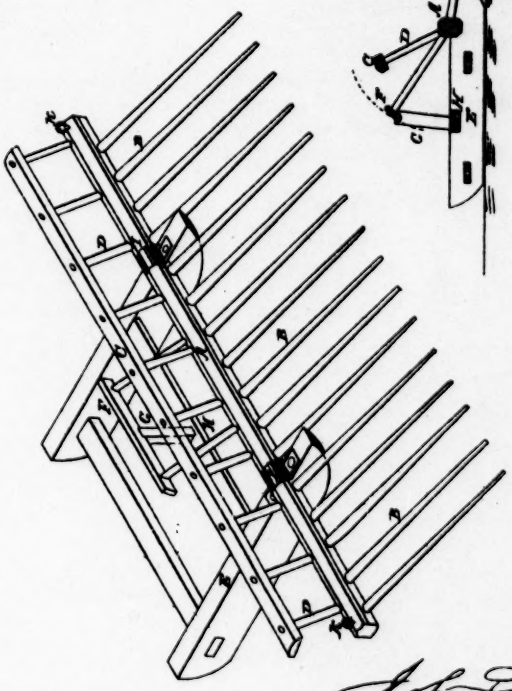
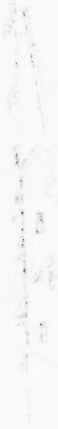


Fig. 1.



Witnesses;
Wm
L. Murphy

Inventor;
John P. Hunter
by
D. P. Holloway & Co
his Attys



In combination with the rake-head A and sled E, the handle F, standard G, and elastic spring-board H, substantially as and for the purpose set forth.

JOHN P. HUNTER.

Witnesses:
JAMES PARK.
SAM. T. MILLER.

472 DEFENDANTS' EXHIBIT GILL PATENT. A. H. A., N. P.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted James H. Gill January 12th, 1858, number 19087, for improvement in hay and straw elevators.

In testimony whereof I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 12th day of April, in the year of our Lord one thousand eight hundred and eighty-six, and of the Independence of the United States the one hundred and tenth.

[SEAL.] M. V. MONTGOMERY,
Commissioner.

473 UNITED STATES OF AMERICA:

To all to whom these letters patent shall come:

Whereas James H. Gill, of Mount Pleasant, Ohio, has alleged that he has invented a new and useful improvement in hay and straw elevators, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire to obtain an exclusive property in the said improvement and praying that a patent may be granted for that purpose:

These, are, therefore to grant, according to law, to the said James H. Gill, his heirs, administrators, or assigns, for the term of fourteen years from the twelfth day of January, one thousand eight hundred and fifty-eight, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said improvement, a description whereof is given in the words of the said James H. Gill in the schedule hereunto annexed and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Paent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this
474 twelfth day of January, in the year of our Lord one thousand eight hundred and fifty-eight, and of the Independence of the United States of America the eighty-second.

[SEAL.] JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

J. HOLT,
Commissioner of Patents.

(Here follows diagram marked p. 475),

476 JAMES H. GILL.

Imp't in Hay and Straw Elevator.

Specification forming part of Letters Patent No. 19087, dated January 12, 1858.

To all whom it may concern:

Be it known that I, James H. Gill, of Mt. Pleasant, in the county of Jefferson and State of Ohio, have invented certain new and useful improvements in hay and straw elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, in which is represented a perspective view of a hay and straw elevator embracing my improvements.

In the construction of elevators for farm purposes they should be so arranged as to possess a general adaptability to the numerous situations and uses to which they can be applied with great advantage on a farm, be portable, durable, and simple in their construction so as to be easily repaired when out of order.

Those heretofore constructed are deficient in some of these important particulars, and the object of my improvements in these machines is in a measure to overcome these defects.

My invention for effecting this object consists—

First. In hinging the base of the boom which sustains the hoisting mechanism to a strong portable carriage, and combining with it an adjustable apron or fender, which not only assists in sustaining the boom in an inclined position, but also serves to protect the bunches of hay and straw as they are elevated, and also the stack or rick while being formed, from injury.

477 Second. In giving support to the stationary section of the fender, and also retaining the sliding section in position as it is raised and keeping it off from the stack, so that it can be formed around it by means of forked holders hinged to the upper part of the sliding section.

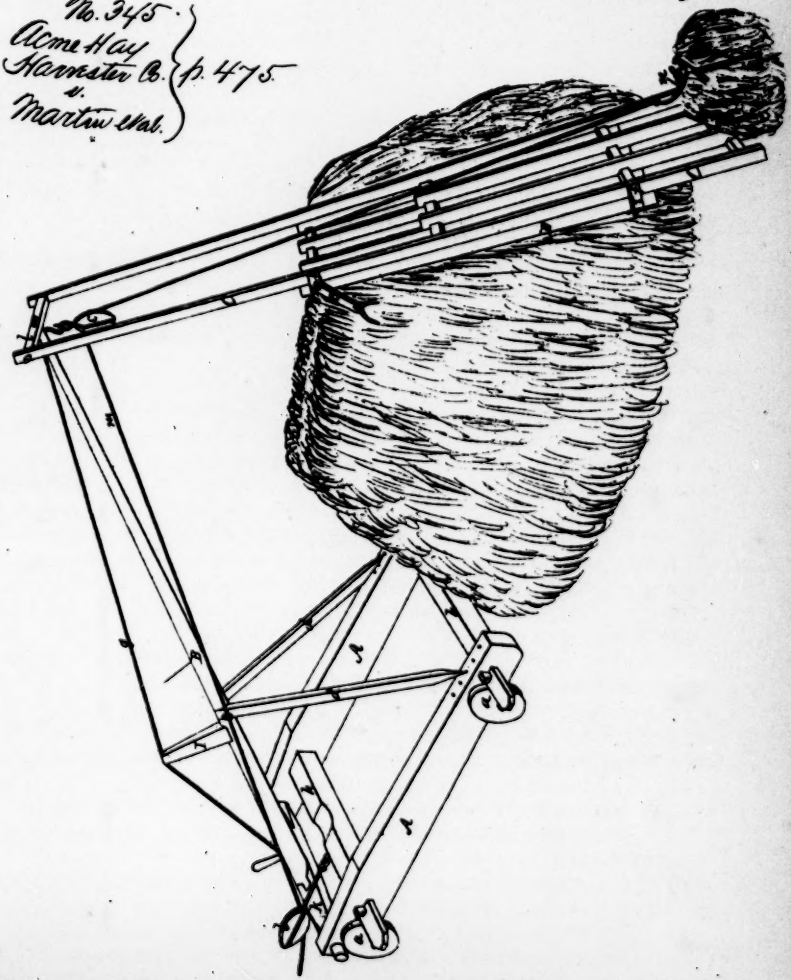
In the accompanying drawing is represented an elevator embracing my improvements, and it consists of a strong frame (A), for the support of a hoisting boom (B), and an adjustable and sliding apron

J. H. Gill,

Hay Elevator.

No 19,087. Patented Jan. 12, 1858.

No. 345 Acme Hay Harvester Co. v. Martin et al. } p. 475



(C), which serves as a fender. The frame (A) is provided with wheels (*a*), which are only used in transporting the machine from place to place.

The boom (B) is tenoned at its lower end to a cross-bar (*b*), which is pivoted to the sides of the framing so as to admit of the boom being raised and lowered. The mortise in the bar (*k*) is made wider than the tenon to admit of lateral motion in the boom, so that its position may be changed without moving the frame. Two braces (*d*) are pivoted to the side of the boom about midway of its length and form a horse for the support of the boom when raised in an inclined position. The feet of the horse rest in notches in the top of the frame to prevent their slipping. The boom is strengthened by a strong rod (*g*) passing over a king post (*i*) on its upper side and confined at each end of the boom. This rod may be provided with a screw buckle, if thought proper, in order to tighten it. Girts (*h*) connect the two sides of the frame and extend beyond their face and against the projections. Stakes may be driven to hold the frame in place and prevent its slipping.

The fender consists of a light stationary frame (C) and a
478 sliding section (D). The side slats of the stationary part extend up and are pivoted to a cross-bar (2) on the end of the boom, thus giving to it support at the point at which it is subjected to the greatest strain and obviating the necessity of counter-weighting the frame to prevent its slipping when heavy weights are raised.

Guides (F) hold the sliding section (D) to the under side of the stationary — (C), and admit of its being raised or lowered in order to bring the top of the fender above the top of the stack or cart. Forked feet (*e*) are hinged to the top of the sliding section, and serve to hold the slide in position as it is raised by resting against the top of the stack, — thus prevent it from sliding back, and also support and stiffen the whole frame while it keeps it off from the stack and admits of the hay being packed and the stack finished around it.

Two pulley blocks (*b c*) are confined to the boom, the one (*c*) at its outer end and the other (*b*) to its lower end or to the girts. A fall rope (*m*) is rove through the blocks, and to its outer end is attached a gathering fork (*n*) similar in construction to a short-handle rake with long, curved teeth. The fall is worked by a horse harnessed to the opposite end.

In using the machine for stacking hay or straw it is drawn to the place at which the stack is to be made, the wheels removed, the boom raised to an inclined position, and adjusted to the proper height by the supporting horse. The hay or straw to be stacked is made into bundles, withed, and drawn to the machine. Into these bundles the fork is hooked and dragged by the horse to the machine and up the inclined fender. When in the right position the horse is stopped,
the bundles lowered between the fender and the frame, the
479 fork drawn out and drawn back by a guy-line attached to it;
hooked into a second bundle while the attendant is spreading the one delivered. This operation is repeated until the stack is completed. The use of the fender may be dispensed with while the stack is low, but it is required after the stack is raised a few feet to

protect both the stack and the bundles. When the cart is to be loaded, either with hay or straw, it is driven between the frame and fender (the machine being located within reach of a stack or mow of hay or straw), the fork *d* is hooked into a mass of hay or straw, which is then raised by the horse and drawn by the attendant to the cart by means of a guy-line and, when in the right position, is drawn out by the attendant on the mow by means of a second guy-line. Thus the cart is loaded or unloaded.

With this machine the ease and rapidity with which large quantities of hay or straw can be moved is vastly increased; consequently the expense of handling these bulky materials is greatly diminished. The comparative small cost of this machine, its simplicity, and its almost universal adaptation for all situations on a farm in which not only hay and straw but other materials are to be loaded or unloaded from carts or formed in stacks or piles gives to it great advantage over the more complicated and expensive elevators that heretofore — been used.

I do not confine myself to the precise method as described of connecting the fender, as many other equivalent ways can be used to accomplish the same object.

Having thus described my improvements in hay and straw elevators, what I claim therein as new, and desire to secure by letters patent, is—

First. The combination of the inclined hoisting boom hinged
480 to the supporting frame with the adjustable fender, arranged as described, for the purpose set forth.

Second. The combination of the hinged forked feet (*e*) with the sliding section of the fender, for the purpose described.

In testimony whereof I have subscribed my name.

JAMES H. GILL.

Witnesses:
JOHN S. HOLLINGSHEAD.
F. SOUTHGATE SMITH.

Ex.: M. McK.; L. E. M.

Endorsed: Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

481 DEFENDANTS' EXHIBIT PERKINS PATENT. A. H. A., N. P.

A. D. 1868, 4th September. No. 2736.

Elevators.

This invention received provisional protection only.

Provisional specification left by Thomas Perkins at the office of the commissioner of patents with his petition on the 4th September, 1868.

I, Thomas Perkins, of Hutchins, in the county of Herts, do hereby declare the nature of the said invention for "improvements in ele-

vators or apparatus to raise agricultural produce onto carts or stacks" to be as follows:

This invention has for its object improvements in elevators or apparatus to raise agricultural produce onto carts or stacks. Elevators are now commonly used for lifting the straw discharged from a thrashing-machine onto a stack, and also for other purposes. When used with the thrashing-machine the elevator is commonly driven from it, but there is often difficulty in arranging the elevator to be so driven when elevators are used separate from thrashing-machines; they are now usually driven by horse-gear.

According to my invention I combine with the elevator a
482 small steam or other motive-power engine, which I fix onto the carriage or bed frame of the elevator, and so make the machine self-acting and independent of other driving apparatus. By this arrangement much time and trouble is saved, as the elevator no longer has to be adjusted in position in relation to external driving mechanism, and as the elevator can now be worked in any position in which it may be convenient to place it. The steam or motive-power mechanism may be arranged so that it can be detached and used to do other work at times in the year when the elevator is out of use.

In order to elevate a cut crop from the ground on which it lies onto a waggon or cart I employ an elevator consisting of a trough-like frame having, as in an ordinary elevator, pulleys at each end of the trough, around which endless chains pass. These chains carry cross-laths with teeth upon them which travel along the trough. The trough is erected in an inclined position, and with its lower end foremost it is drawn over the land. Inclined rake teeth are fixed at the front end of the trough, and these points rest on the land. The crop, as the machine meets it, rises up the inclined teeth, and from the top of this incline the elevating chains take the crop and carry it to the top of the trough, where it is discharged and falls into the cart or waggon which imme-
483 diately follows the apparatus. The lower end of the trough is supported on a castor wheel or wheels, but the main carrying wheels of the elevator are underneath the trough and about midway of its length, or the castor wheels may be traveling wheels. A frame-work connects these wheels with the trough, and from them by a driving band, rope, or chain the endless elevating chains are driven. The apparatus may be drawn by horses, one on either side of the fore end of the trough. They are harnassed in shafts or to poles which are there provided, or it may be worked by horses harnassed quite in front of the machine, but so far separated from each other as to allow of their walking one on either side of the windrow of hay or corn which lies between them without trampling upon it.

The cart or waggon following the apparatus may be drawn by its own horse or horses working underneath the upper end of the trough immediately behind the carrying wheels of the elevator, and the bridles of the cart or waggon horses may be attached to the elevator so as to make them follow in their proper places, or the cart or waggon may itself be attached to the elevator and be so drawn along

behind it, or the elevator may be pushed before the cart to help the crop up the inclined teeth until the elevating chains take it.

484 I sometimes employ a short set of endless chains or one or more revolving barrels. These chains or barrels are provided with spikes or teeth, and they stand immediately over inclined rake teeth, so that the spikes or teeth draw the crop up the incline to the point where the elevating chains take it. Provision may be made for steering the machine indepen-tly of the horses by a lever or other steerage appliance connected with the castor wheel or wheels.

London:
Printed by George Edward Eyre and William Spottiswoode, printers to the Queen's Most Excellent Majesty, 1869.

Endorsed: Filed Nov. 18, 1887. Wm. H. Bradley, clerk.

(Here follows diagram marked p. 485.)

486 Afterwards, to wit, on the nineteenth day of January, 1888, there was filed in said clerk's office an appeal bond in said entitled cause; which said appeal bond is in the words and figures following, to wit:

Appeal Bond.

In the United States Circuit Court for the Northern District of Illinois.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*
} In Equity.

Know all men by these presents that we, The Acme Hay Harvester Company, the complainant above named, and John E. Kirk, Delos S. Brown, and Horace A. Alden, residents of the city of Peoria, in the northern district of Illinois, are hereby held and firmly bound unto Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters in the sum of one thousand dollars ($1,000.00), to be paid to the said Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, their heirs, executors, administrators, and assigns; to which payment, well and truly to be made, we, the said Acme Hay Harvester Company and the said John E. Kirk, Delos S. Brown, and Horace A. Alden, do by these presents, jointly and severally, bind

487 ourselves, the successors and assigns of the Acme Hay Harvester Company and the heirs, executors, administrators, and assigns of the said John E. Kirk, Delos S. Brown, and Horace A. Alden, firmly by these presents.

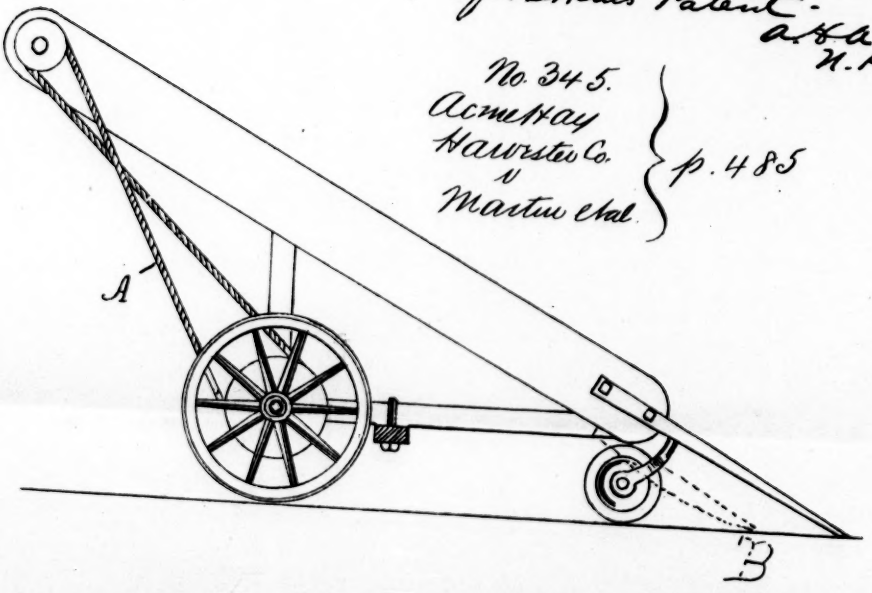
Sealed with our seals and dated, at Peoria, Illinois, this 16th day of January, A. D. 1888.

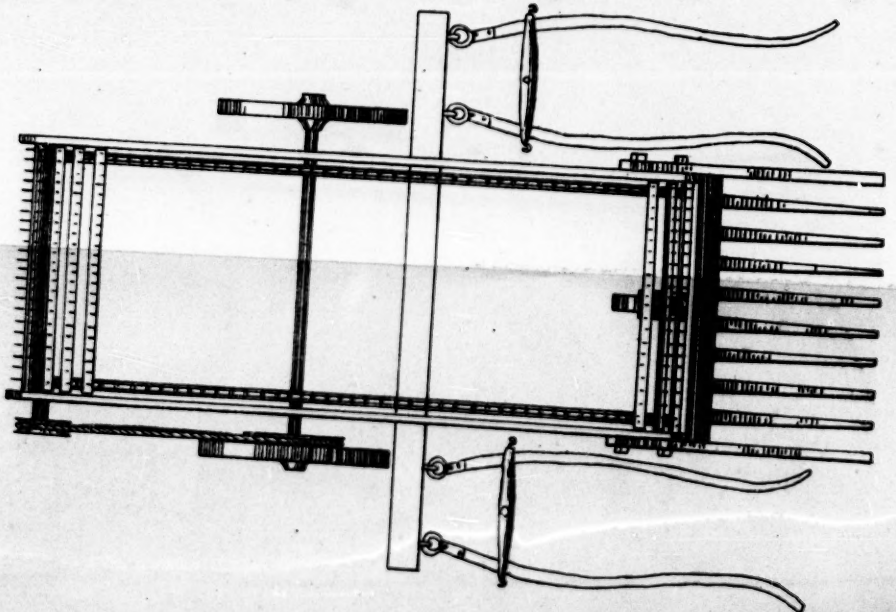
Whereas lately, at the Dec. term, 1887, of the United States circuit court for the northern district of Illinois, in a suit pending in said

U. S. Circuit Court
North. Distrct Illinois
The Acme Hay Harvester Company vs. Stephen Martin et al } In Equity

Defendants Exhibit Drawing of Perkins Patent.
A. H. A.
N. P.

No. 345.
Acme Hay Harvester Co. v Martin et al } p. 485





court between the Acme Hay Harvester Company and the said Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, and Charles O. Peters, a decree was entered against the said Acme Hay Harvester Company, and said Acme Hay Harvester Company has taken an appeal to the Supreme Court to reverse said decree:

Now, therefore, the condition of this obligation is such that if the above-named Acme Hay Harvester Company shall prosecute its said appeal to effect and answer all damages and costs if it fail to make its plea good, then the above obligation to be void; otherwise to remain in full force and virtue.

[Corporation Seal.]

ACME HAY HARVESTER COMPANY,
By JOHN E. KIRK, *President.*
JOHN E. KIRK. [SEAL.]
DELOS S. BROWN. [SEAL.]
HORACE A. ALDEN. [SEAL.]

Approved.
H. W. BLODGETT, *Judge.*

Endorsed: Filed Jan'y 19, 1888. Wm. H. Bradley, clerk.

488 Afterwards, to wit, on the tenth day of February, 1888, there was filed in said clerk's office a stipulation in said entitled cause; which said stipulation is in the words and figures following, to wit:

Stipulation.

United States Circuit Court, Northern District of Illinois.

ACME HAY HARVESTER COMPANY
vs.
STEPHEN MARTIN *et al.*

It is hereby stipulated by and between counsel for the respective parties that all printed lithographs, circulars, and advertisements introduced as exhibits in the evidence in this cause may be omitted from the transcript of the record to the Supreme Court on appeal without prejudice to the right of either party to produce any of said exhibits for the consideration of the court at the hearing of said appeal, said exhibits to be considered & treated as mechanical exhibits.

WEST & BOND,
For Stephen Martin et al., Appellees.
PEIRCE & FISHER,
For Acme Hay Harvester Co., Appellant.

Endorsed: Filed Feb. 10, 1888. Wm. H. Bradley, clerk.

489 NORTHERN DISTRICT OF ILLINOIS, *ss:*

I, William H. Bradley, clerk of the circuit court of the United States for said northern district of Illinois, do hereby certify the above and foregoing to be a true and correct transcript of the record of all the proceedings had in said court (under the stipulation filed February tenth, 1888) in the cause wherein The Acme Hay Harvester Company is complainant and Stephen Martin, Thomas Martin, Charles D. Smalley, Joseph B. Duncan, and Charles O. Peters are the defendants as the same appear from the files and records of said court now remaining in my custody and control.

Seal of the Circuit Court U. S., Northern Dist. Illinois, 1855.

In testimony whereof I have hereunto set my hand and affixed the seal of said court, at my office, in Chicago, in said district, this tenth day of March, 1888.

WM. H. BRADLEY, *Clerk.*

Endorsed on cover: N. Illinois C. C. U. S. No. 345. The Acme Hay Harvester Company, appellant, *vs.* Stephen Martin, Thomas Martin, Charles O. Smalley, Joseph B. Duncan, & Charles O. Peters. Filed March 27, 1888.

FILED
APR 15 1891
JAMES H. McKENNEY,
CLERK.

Supreme Court of the United States.

No. 345.

ACME HAY HARVESTER COMPANY,
Appellant,

vs.

STEVEN MARTIN,
THOMAS MARTIN,
CHARLES O. SMALLEY,
JOSEPH B. DUNCAN and
CHARLES O. PETERS,
Appellees.

IN CHANCERY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF ILLINOIS.

BRIEF FOR APPELLANT.

GEORGE HARDING,
JAMES H. PEIRCE,
GEORGE P. FISHER, JR.,
Of Counsel for Appellant.

EASTMAN BROS., LAW PRINTERS, 187 WASHINGTON ST., CHICAGO.

Supreme Court of the United States.

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CHARLES O. SMALLEY,
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CHARLES O. PETERS,
Appellees.

IN CHANCERY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF ILLINOIS.

BRIEF FOR APPELLANT.

Suit in this case is brought for the infringement by defendants of letters patent No. 259,550, granted to Martin H. Kenaga, June 13, 1882, for an improvement in Horse Hay-Rakes.

The defendants do not deny complainant's title, and only contend, first, that the complainant's patent is invalid for want of novelty, and, second, that they do not infringe.

Proofs were taken, and upon final hearing, the bill was dismissed for want of equity. From the decree dismissing the bill of complaint, this appeal is taken.

The error assigned is as follows, viz.:

That the Court erred in dismissing the bill for want of equity.

The opinion of the Court upon which was based the de-

cree dismissing the bill shows error more particularly in the following respects:

First: The Court misapprehended the true scope of the invention defined in the patent in suit.

(a.) The invention set forth in the Kenaga patent is not the attachment to a sweep-rake of a pole or tongue, such as has been employed time out of mind upon vehicles of all kinds, because the ordinary vehicle pole or tongue attached in the usual way to the sweep-rake would render it utterly unfit for the service for which the Kenaga rake was specifically designed.

(b.) The invention set forth in the Kenaga patent in suit does not consist merely in attaching to each end of the rake head a pole or tongue in the manner in which poles or tongues have been before commonly employed, because the record shows that in ordinary vehicles, poles or tongues are attached in such manner as to extend simply in forward and sometimes upward direction, but never in *outward* direction, whereas it conclusively appears from the record that, unless poles are attached to the ends of a sweep-rake in the peculiar manner defined in the Kenaga patent—that is to say, with their ends projecting *outwardly*, as well as forwardly and upwardly, the poles could not possibly perform the functions for which they are employed by Kenaga.

(c.) The claim of the Kenaga patent defines as an element of the combination set forth therein, the "projecting poles C C," which the specification of the patent describes as "directed forward, upward and outward" from the end of the rake. The record shows that this arrangement of the poles—an arrangement that would absolutely defeat their operation in any other class of vehicles—is essential to their employment in connection with sweep-rakes, because, unless the poles project outwardly, *i. e.*, laterally from the rake head, they cannot serve either as guides to the horses or as guards

to prevent their feet from being struck by the teeth of the rake in its irregular movements.

Second: The Court erred in finding that the subject-matter set forth in the Kenaga patent was devoid of patentable novelty in view of the prior common use of poles and thills in vehicles.

(a.) The record shows that tongues and poles when before employed in vehicles have performed simply the function of permitting the vehicles to be backed and guided by the animals hitched thereto, whereas, with poles projecting outwardly from the ends of the rake head, as defined in the Kenaga patent, a new function is given to the poles, namely, that of enabling the poles to guide the horses separately attached to the ends of the rake, and to guard them from the rake teeth.

(b.) That invention was required to produce the construction defined in the Kenaga patent is clearly evidenced by the following facts fully established by the record: First, notwithstanding the fact that sweep rakes with horses attached at their ends required separate riders for the horses, and were, consequently, twice as expensive in operation as the Kenaga rake, and the fact that at least one-third more work can be done with the Kenaga rake than with the old form of sweep rake which preceded it, no one in the many years during which these sweep rakes were employed, prior to Kenaga, conceived the feasibility of attaching poles to the ends of a rake in the peculiar manner defined in the Kenaga patent. Second, when attempt was made to provide a broad sweep rake with a backing pole, it was thought necessary to place the pole behind the rake, and to provide there a supplemental frame, to which the horses could be attached. Third, farmers, implement dealers and others long familiar with the management of horses, and with the use of sweep rakes,

did not believe it possible to dispense with the separate riders and control the horses hitched at the ends of the rake by a single driver; and such operation would have been in fact impossible with the poles arranged after the manner of ordinary vehicle poles, and was only made possible when such poles were attached to the rake-head in the peculiar and novel manner defined in the Kenaga patent.

Third: The Court erred in the finding that in view of the Hudson patent of 1869 no invention was required to produce the Kenaga device.

(a.) The Hudson patent of 1869 was unworthy the importance attached to it by the Court, because this patent does not differ from the ordinary sweep rake, requiring separate riders for the horses, except in the particular that it is provided with forwardly extending bars to enable the rider upon each horse to lift the rake-teeth over obstructions.

(b.) The Hudson patent makes no provision for hitching the horses forward; shows no poles to which the horses could possibly be hitched; shows no poles projecting laterally in such manner as to perform the essential features of guiding the horses and guarding them from injury by the rake-teeth; shows no poles connected with the rake-head in such manner that they could serve to back the rake from beneath its load.

(c.) The testimony of several witnesses, including the patentee, Hudson himself, conclusively proves that the Hudson rake is utterly incapable of any mode of operation like that of the Kenaga invention; that it would be impossible to hitch horses to the forward ends of the poles; that if the horses were so attached, the poles being located above the rake-teeth and not extending laterally therefrom, would not aid in guiding the horses or in keeping them off the rake-teeth.

(d.) The testimony of Mr. Hudson shows that there was

but one of these rakes made, and that one was, after short use, discarded; that it did not answer the purpose for which it was designed, and that it never afforded to the patentee any suggestion that the horses could be attached to the poles in such manner as to permit the rake to be managed by a single driver, and further shows that if the horses had been attached to the poles the movements of the horses would have broken off the uprights to which the poles were connected.

(e.) The experiments with the Hudson rake, as set forth in the record, conclusively prove that the poles of this rake could not possibly be employed to perform the functions of the poles defined in the claim of the Kenaga patent. The manœuvers of the team in wheeling, advancing and backing cannot be controlled by the poles of the Hudson rake.

THE KENAGA INVENTION.

The specification of the Kenaga patent states that the "invention relates to horse hay rakes, or 'sweeps,' of the class employed in connection with stackers, and particularly to those rakes of this class which are drawn by horses hitched one at each end." It appears from the record (Rec., pp. 25 and 55), that at the time of the Kenaga invention these "sweeps" were ordinarily made from sixteen to twenty feet in length, with teeth usually about eight feet in length, which projected forward from the rake head, the latter being mounted either upon wheels or upon runners. The advantages of this type of hay rake which particularly adapted it for use in the gathering of hay upon the broad western prairies, were due to the fact not only that a very large load could be collected upon the long teeth, but to the further fact that by reason of the attachment of the horses at the ends of the rake, the load, when gathered, could be drawn to the platform of the stacking machine, or could be de-

livered in much closer proximity to the stack than would be possible were the horses attached to the front of the rake. And after such load was delivered the rake could be withdrawn without backing the horses over the pile of hay. It is these features of the long sweep rake which have caused it to be universally adopted in connection with the modern type of stacker (such, for example, as is shown by the catalogues of both the complainants and the defendants in this case), in which the load, after having been collected, is deposited upon a platform adapted to be swung above the stack; for it would obviously be impracticable to use in connection with this type of stackers any form of rake that would necessitate the passage of the horses on to the stacker head or platform, or the backing of the horses over the mass of hay in order to free the rake therefrom. Whilst this type of hay rake possesses the above mentioned features of advantage, there were, incident to its use, a number of practical disadvantages, not only in its operation in connection with the stacker, but as well also in its work when gathering its load in the field. An important disadvantage is recognized in the specification of the Kenaga patent in the following language:

"Heretofore such rakes or 'sweeps' (which are about twelve feet long) have been drawn out from beneath the load when delivered to the stacker by wheeling the horses about and drawing the rake backward. Thus managed, each horse requires a separate rider, who must be a boy not so large as to overburden the animal, and yet old enough to manage the horses intelligently. The difficulty in obtaining boys of the proper age for this purpose during the hay ing season is found to be a practically fatal objection to this form of rake." The record also shows (Rec., pp. 26, 99, 102, 107 and 110) that this use of two separate riders or drivers for the horses and the consequent necessity of turning the horses about whenever it was required to back the

rake, was also attendant with the following serious objections, viz: When the rake was being drawn onto or away from the platform of the stacker, there was danger of the separate riders moving their horses unequally, and consequently causing the teeth of the rake to interfere with and break the teeth of the platform, or be broken thereby; and there was also a loss of time incident to the wheeling of the horses and withdrawal of the rake from beneath its load, and again wheeling the horses when a new load was to be collected. In field operation this old form of rake was objectionable, as appears from the record, because the riders upon the backs of the horses heated them and imposed an additional burden, and because, whenever an obstruction was met with, as, for example, the lodging of a wet bunch of hay upon the rake teeth, or the catching of the points of the teeth in grass roots or other impediments, it was necessary for the riders to stop their horses, wheel them around, and draw the rake backward until the points of the teeth were freed from the obstruction. So, also, there was the danger of the horses' feet becoming entangled in or being struck by the teeth of the rake, particularly in case the outer teeth at either side should accidentally catch an obstruction which would permit the horse at the opposite side to move forward and pull the rake around onto the horse at the obstructed side. In short, in the old forms of rakes, there was no provision whereby the horses could be guided except by the separate riders, or the horses be prevented from being injured by the long teeth of the rake. Besides, because of the need of two riders, the cost of operation was, so far, double that of the ordinary farm implements.

The record shows beyond question that in every prior form of sweep rake, or rake having horses attached to its ends, each and every one of the above mentioned objections existed.

The object of the Kenaga invention is thus briefly stated in the specification of his patent: "By my invention I

seek to do away with the use of riders, and to enable a single man or boy to manage both horses, so attached (*i. e.* at the ends of the rake), such person being mounted on the rake or walking behind it." Plainly it was the purpose of the inventor to remedy all the defects above mentioned incident to the old form of sweep rakes, since all of these defects related to the *management* of the horses with respect to the rake, either at the stacker or in the field operations; their management both in backing the rake, and in their forward movement, so as to prevent them from being struck by the rake-teeth, for in order that a single driver shall be able *to manage* the horses, the provision to this end must enable him not only to manage them so as to properly back the rake, but also to so manage them as to prevent them from getting upon the rake-teeth or being struck thereby. While it is true that Kenaga has not, in his description, recited specifically all of the objections incident to the old form of sweep rakes, nor stated all the advantages resulting from his improvement, this is of no importance, first, because the law does not require such a recital or statement, but gives him the benefit of all the merits and functions of his apparatus whether stated or not; and, second, because such recital would render the specification unnecessarily prolix.

Appreciating the disadvantages incident to the old type of sweep rakes, Kenega discovered that if *proper* provision were made, whereby the horses attached at the sides of the rake could back the rake-teeth from beneath the load, all these disadvantages would, at the same time, be overcome, and the chief object of the invention, as set forth in the patent, viz., "to do away with the use of riders and to enable a single man or boy to manage both horses," would be attained. After the above recital of the object of his invention, he therefore states that "to this end my invention consists in providing means at each end of the rake whereby the horses there attached may back the rake out from under

its load, instead of turning around and drawing it out." Whilst this statement of invention refers in terms to the backing operation of the rake only, we submit that, taken in connection with the stated purpose of the invention which immediately precedes it, viz., "to do away with the use of riders and to enable a single man or boy to manage both horses," and the minute description that follows, there can be no question but that the "means" referred to in such statement must be such means as would enable the specifically stated object of the invention to be attained. It would be folly to assume that the inventor should in one breath state that the object of his invention was "to do away with the use of riders and to enable a single man or boy to manage both horses," and in the next breath should seek to cover any means other than such as would enable this object of invention to be accomplished. And yet the defendants, in their efforts to belittle the Kenega invention, strenuously urge in the face of the plain meaning of this specification, that the only purpose of such invention was to provide some means of backing the rake, and that the patent is designed to cover any means, regardless of the fact that these means were to be so specifically arranged with respect to the long projecting rake-teeth, that they should perform various other functions necessary "to enable a single man or boy to manage both horses." The means by which a single man or boy is enabled to manage the horses thus remotely attached at the ends of the rake are defined in the patent as follows: "C C are stiff poles secured permanently or removably to the ends of the rake-head, and, as here arranged, directed forward, upward and outward therefrom so that the free end of each is in position to allow the adjacent horse to be hitched thereto by a breast-strap." It will be observed in what entire conformity with the previously stated object of the invention is this description. The poles are so placed

that they not only enable the horses to back the rake (which operation alone could be accomplished if they were arranged like the ordinary pole of a wagon), but by reason of the fact that their front ends are extended outwardly to points at a distance from the teeth, they serve to guide the horses during the turnimg of the rake and prevent them from being struck by the rake-teeth, in order that in all their movements it shall be possible for a single man or boy to manage them. The specification continues: "D is a seat for the driver supported upon the rake-head and located at the rear of its axis. The horses being hitched to the projecting arms B B for draft, and hitched forward to the poles C C for backing, the driver from his position at the rear of the rake may direct or back the horses with ease. By having the reins split back to a point in convenient reach he will be able to back one horse or otherwise to manage him independently of the other. An iron hook *c* extending outward from the end of the pole C will give a hitching point more directly in front of the horse. . . . The aggregate weight of the rake-teeth E in this form of sweep is very considerable, and the driver's seat, it is found, may be located some distance from the rear of the axial support of the rake, and be sustained therefrom, as shown, without the aid of any third wheel or other bearing on the ground. When the rake is loaded, the weight of the driver so seated is a positive and appreciable advantage, since the load bears heavily on the front end of the rake-teeth which slide on the ground. Carrying the driver in the position indicated on the machine described, therefore, positively lightens the draft on the team." From this description of his invention it is manifest that Kenaga had in mind not merely the provision of poles to accomplish the backing of the rake from beneath its load, but also to accomplish this operation in such manner and by such means that at the same time the main object of his invention, viz.,

to enable a single man or boy to manage both horses under all conditions, should be attained. And with this object in view, the poles are so directed outwardly that their forward ends are brought at such distance from the long projecting rake-teeth as that these poles shall serve not merely as a means for backing the rake, but will also serve further the important function of so guiding and guarding the horses during the various movements of the rake that they will not be struck by the rake-teeth—a function which the driver, but for these poles, would be powerless to perform. Certainly it cannot be said that any mechanic or expert with a fair share of skill could, after reading the specification of this patent as an entirety, entertain a shadow of doubt as to the feature which Kenaga designed to set forth as distinguishing his sweep rake from the old sweeps that had preceded it in the art.

SUGGESTED USE OF THILLS.

Following that portion of the specification in which the patentee sets out the construction and arrangement of the poles whereby a single driver is enabled to manage the horses remotely attached to draft-bars at the ends of the rake, there occurs, in the following language, a suggestion as to other means of effecting the object of the invention: "If preferred, a pair of thills may be connected with each of the arms B B, in which the horse is hitched in the usual way, which construction would be the equivalent of that shown in the drawing. When thills are used, however, it will be advisable to employ the poles C, by which to hitch the horses' heads as an aid in guiding them, in which case said poles may be relatively light." So far as appears from the record, no one has ever sought to employ this form of the invention; and it would be unnecessary to consider these statements were it not for the fact that great stress has been

laid thereon by the defendants in their attempt to show an analogous use of thills in other types of machines, and to argue from such showing that a stated equivalent of the patentee's invention is old in the art, and that the main invention must therefore fall. It appears from the cross-examination of Mr. Dayton (Rec., 133), who prepared the Kenaga specification, that after he had stated therein that thills could be used instead of poles, he was instructed by Mr. Kenaga to state that if thills were used, adjunctive poles to aid in guiding the horses would be necessary. It will be observed that this suggested modification, thus briefly mentioned in the specification, is not illustrated in the drawings, nor is it perfectly obvious how, with draft-bars inclined as there shown, the thills would be attached, or whether there would be one or two points of attachment for each pair of thills, so as to guard against lateral movement; but however it may have been the inventor's design to attach such thills, he expressly states that when they are employed, poles should be added to aid in guiding the horses. It appears from the testimony both of Mr. Kirk and of the defendants' expert, Mr. Dain, that if the thills should be so attached to the draft-beams as to permit of lateral movement, the additional poles would not only be advisable, but necessary for the guidance of horses; and Mr. Kirk testifies also that even if laterally immovable thills were employed, without the poles, they would not serve to enable a single driver to manage both horses, and consequently would not permit the stated object of the Kenaga invention to be accomplished. We submit, however, that a fair reading of the portion of the specification which refers to a use of thills, and a due regard for the object of the invention, must make it plain that it was not the design of the patentee to specify the use of thills alone as the full equivalent, for all the purposes of his invention, of the previously described construction and arrangement of

poles. It is plain, however, that this statement of the specification as to the use of thills is but a suggestion, and even were it admitted that the language could be construed fairly to mean that thills might be employed alone, as substitutes for the poles, still the fact which appears from the record and which has not been controverted, that thills without the use of guide poles can not be practically substituted for the poles of the patent, we submit would outweigh the statement of the specification as to such equivalency. Certainly no court of equity would fritter away a patentee's rights to a valuable invention because he may have suggested in his specification that a modification of the invention might be made which in point of fact would not fully accomplish the specifically claimed mechanism by which the object of his invention is accomplished.

This question of the importance to be attached to a modification suggested in the patent has been frequently before this court, but in no case, so far as we are aware, has such suggestion been allowed to destroy the rights of the patentee.

In the case of *Brown* v. *Deer*, 21 Fed. Rep., 769, Blodgett, J., the court said, in referring to a modification suggested in the specification: "But the only suggestion made in the specification of a mode for rocking the pipe-shaft backward so as to hold the plows more firmly upon the ground, is by means of the arm M, and there is nothing in the proof tending to show that this special device has been found useful or adopted in practice. It seems to me that whatever allusion there may be in this first claim to this arm or projection M, may be considered as coming within the well-known maxim in pleading, '*Utile per inutile non vitiatur*'—that which is serviceable is not rendered invalid by that which is useless."

Precisely this question was also raised in the case of *Mallory Mfg. Co.* v. *Marks*, Blatchford, J., 11 Fed. Rep. 887.

The claim of the patent involved in that suit reads as follows: "The combinationof the brim of a hat with a drooping hoop, so that the brim is caused to droop at the front and the rear and to rise at the sides, substantially as set forth." The specification of the patent, after reciting with exactness the manner in which the hat brim with its drooping hoop was to be formed, contained also the following suggestion: "My invention may be used by forming the hoop of straight, untwisted concavo-convex wire." The court construed the claim to cover a hat brim formed in accordance with the preferred embodiment of the invention, as stated in the specification, and said: "The remark in the specification that the 'invention may be used by forming the hoop of straight, untwisted concavo-convex wire,' must be rejected as not affecting the proper construction of the claim, and the hoop of the claim must be a spring-hoop *twisted* substantially in the manner described in the patent. This construction is necessary to sustain the claim in view of the state of the art, as shown."

We submit, therefore, that it is apparent from a reading of the specification of the patent that the feature designed to be indicated therein as of Kenaga's invention, is the projecting poles C at the ends of the rake extending upwardly, forwardly and outwardly in such manner with respect to the rake-head and its long teeth as to enable the rake to be backed and otherwise operated under such conditions that the specifically stated object of the invention, viz., "to enable a single man or boy to manage both horses," can at the same time be accomplished.

THE CLAIM OF OF THE KENAGA PATENT.

The Kenaga patent contains but a single claim, which is as follows: "In a horse-rake, having the horse independently attached at the ends of the rake, the projecting draft-bars

B B in combination with the projecting poles C C for hitching the horses forward, whereby they may back the rake from beneath its load, sustantially as described."

This claim is precisely the same in scope with the invention defined in the body of the specification. It states concisely the peculiar kind of rake to which the invention is applicable—that is to say, the old, broad sweep-rake having the horses independently hitched at the ends, and claims the combination with the projecting draft-bars of such rake, of "the projecting poles C C," thereby distinguishing such poles as the novel feature of the invention. The claim adds, however, that these projecting poles are "for hitching the horses forward, whereby they may back the rake from beneath its load, substantially as described." Taken in connection with the statement of the object of the invention, it is plain that this "hitching of the horses forward whereby they may back the rake from beneath its load, substantially as described," means that the poles shall project in such manner as to enable the horses to back the rake under the exclusive management of a single man or boy walking or riding behind the middle of the rake.

"The projecting poles C C" mentioned in the claim are undoubtedly the same poles C C defined in the specification as poles directed "forward, upward and outward" from the ends of the rake head. It could not have been the patentee's purpose to include *generally* the employment of poles at the ends of a sweep rake, because it was only under the special arrangement of upward, forward and outward projection, so specifically described, that the functions attributed to these poles could be attained. It is abundantly proven by the record that if the poles were arranged so as to project forwardly and upwardly only, they would be absolutely inoperative to accomplish the stated purpose of the invention of doing away with the use of riders, and enabling a single man or boy to manage both horses. Manifestly, it would be un-

reasonable to assume that the patentee, when stating as an element of his claim "the projecting poles C C . . . substantially as described," designed that these poles should be other or different from the poles of the specification, or that they should be poles possessing functions other or different from the functions of poles described, or should include any arrangement of poles except such as would accomplish the clearly defined purpose of the invention. The rule of law is familiar that where a patentee defines in the specification a certain element as of peculiar construction or arrangement, and in his claim specifically includes such element, and distinguishes it by the same letters of reference as are employed in the specification, such element of the claim shall be held to mean the same element so specifically described and possessing the functions attributed to such element in the specification. (*Weir* v. *Morden*, 125 U. S., p. 98.) Under this rule of construction we submit that the projecting poles C C of the claims are the same poles described in the specification and designated in the drawing by like letters of reference; that is to say, they are poles attached to the ends of the sweep rake, and project upwardly, forwardly and *outwardly* therefrom.

UTILITY OF THE KENAGA INVENTION.

From the testimony of Mr. John E. Kirk, president of the complainant company (Rec., p. 26), it appears that he was engaged in the manufacture and sale of the old form of sweep rake from the year 1876 to the year 1882 inclusive, his sales in the last mentioned year amounting to 750 rakes. Mr. Kirk further states that when Kenaga made his first rake he invited him to go over and witness the working of it and says (Rec., p. 28): "I went, during the hay harvest of 1882, and there witnessed the working of said rake and was fully convinced, by means of Kenaga's invention, that

said rakes were made much more practical and desirable than any I had ever previously seen, used, made, or seen used." Mr. Kirk then made arrangements with Mr. Kenaga for the introduction of the invention, and in the same year (1882) made six or eight for exhibition at various State and District Fairs. He further states that "in 1883 I made 1,200 of said rakes, and made and sold about 300 attachments, consisting of tongues, wheels, seat and spring, to change the drag rakes I had before made into rakes of the Kenaga construction." In 1884 the complainant company made 2,100 of said Kenaga rakes and about 300 attachments to change drag rakes before made and sold to the Kenaga construction, and in 1885 the complainant company made 2,800 rakes, and in 1886, 3,000. With regard to these attachments made for the purpose of converting the old sweep rake into the Kenaga rake, Mr. Kirk states that their manufacture arose from the urgent demand of customers to whom he had sold the old style of drag rake, since by reason of such attachments, the old rake could be made to produce the advantages due to the Kenaga invention. He states also that this demand for attachments still continues and that the complainant company yearly furnishes a great number of them. (Rec., p. 30.)

It also appears from the testimony of this witness that since Kenaga's invention was introduced to the public it has practically driven the old form of sweep rake from the market. Defendants' witness, Mr. Dain, who is travelling salesman for the company manufacturing the rake sold by these defendants, admits this important fact upon his cross-examination, where he was asked (Rec., p. 214):

"C. Int. 109. Is it a fact, that since the introduction of the first rakes having projecting poles at their ends and draft bars, that such form of rakes have very largely superceded the old form of drag rake?

"A. It is."

As to the relative cost of operating the old drag rake and of that embodying the Kenaga invention, Mr. Kirk says (Rec., p. 30): "In operating the drag rake, as per 'Exhibit Kirk Drag Rake,' it requires two men or two boys twelve to fifteen years old; in operating the Kenaga rake it would only require one of those two boys. The two boys are usually hired for about the same price as one man."

Defendants' witness, Mr. Dain, admits this, and in fact it is proven beyond question; indeed it is a self-evident fact that the cost of operating the Kenaga rake is only one-half the cost of operating the old form of sweep rake which it has superceded in the market.

The defendants have sought to show in their testimony that aside from the saving, due to the fact that a rake made in accordance with the Kenaga invention can be operated for one-half the cost of the old form of sweep rake, no additional advantages are due to such invention. Upon this point we will simply call attention to the testimony of various persons, who, by reason of practical experience, are able to state with certainty as to the comparative capacity of the old form of sweep rake and of that made in accordance with the Kenaga invention. Mr. Kirk, after stating the difficulties incident to the old form of drag rake (Rec., p. 26), and stating that these difficulties were overcome by the employment of the Kenaga invention, says, with regard to the relative capacity for the day's work of the Kenaga rake, when compared with the old style of drag rake, as follows (Rec., p. 30): "Assuming the same width, the same kind of ground and the same kind of hay and hauled equal distances with the same hands and same team—all conditions in fact being equal—in my experience, the Kenaga rake is enabled to gather up from a third to a half more hay than any of the other rakes."

Oscar A. Hale, a farmer of twenty-four year's experience, states that in 1882 he used the old form of sweep rake, and

in 1883 used the same rake modified in accordance with the Kenaga patent, by means of attachments purchased from Mr. Kirk. This witness, having stated that there was an advantage incident to the use of the poles in connection with the drag rakes, was asked (Rec., p. 86): "How much of an advantage in the day's run do you think it to be?" He answered: "Well, about one-third saving in good ground; that is, we can put up one-third more hay and save one boy. In rough ground we can save, at least, one-half." And this statement is reiterated on cross-examination, where it also appears that the same machinery was used for stacking and ricking the hay in the year 1882 and in the year 1883, from the operations in which years the comparison was made. (Rec., p. 88.)

Nelson S. Johnson, a farmer and former implement dealer, who is familiar with both the old sweep rake and the Kenaga rake, also testifies as to the decided advantage attained by the Kenaga invention (Rec., p. 90), and in this statement also he is corroborated by Nathaniel T. Patton, another dealer in farm implements, also familiar with the various kinds of hay rakes. This last witness also states that all the old drag rakes sold by him during the years 1882 and 1883 have been changed into pole rakes in accordance with the Kenaga patent, and this, too, without any effort upon the part of the seller of the rakes to induce customers to make such change. (Rec., p. 93.)

William Finnell, another witness on behalf of the complainants, testifies that during the year 1882 he used the old form of drag rake, and that in 1883 he changed such drag rake to a pole rake like that of the Kenaga patent by adding the attachments bought from Mr. Kirk. This witness states (Rec., p. 98), when asked to estimate the money saved by the use of the pole rake over the drag rake per day, that he thinks the amount "at least $3 in the hire of the men and their board; besides they will do so much

more work." He states it also as his opinion when asked the question, "About how much more work will the pole rake do?" "Well, it depends considerably on the hay; I think about a third more, anyhow." When asked to account for the increased capacity of the pole rake over the ordinary drag rake, he says (Rec., p. 99): "When the boys are driving, one boy would not start when the other would, and then when he would start, the other would be too far ahead; and when there is one boy driving, he holds either horse and lets the rake come round where he wants to, without any delay; when he goes in on the ricker, he drives the two horses in even together, straight on the ricker, and when there are two boys, one of them will keep his horse too slow and go in crooked on the ricker, and break a tooth in the ricker or in the rake that he is driving."

Frank Corrington, a farmer, who used first the old drag rake and subsequently modified such rake so as to embody the Kenaga invention, testifies (Rec., p. 102) that the Kenaga rake has the advantage of allowing one man to handle it in place of two, with much greater advantage; and when asked the question, "About how much more hay to the day do you think can be raked with the pole rake?" answered: "I can't tell how much. If the hay is heavy on the ground, you might rake a third or a half more; if it is light, probably it would not rake more than one-fourth more." This witness also gives the following explanation of the increased capacity of the Kenaga rake over the old drag rake: "If the teeth catch in the ground, you have the advantage of backing out, without turning your horses around. One man can drive straigter and rake the hay cleaner; and leaving the hay on the pitcher-head you back out without turning the horses. Going to the field with the empty rake, if a bunch of hay is missed or left in the field, you can gather it up. The old rake had to be dragged backward, so that there was no chance to gather up scattered hay." He also

states that with the old drag rake there was danger of breaking the teeth or fingers of the ricker platform or of the rake, and gives it as his opinion that there is a difference of from $3.00 to $4.00 a day in favor of the Kenaga rake, in the matter of men's wages and running expenses.

George Pfeiffer, Jr., a witness familiar with the construction and operation of both the old drag rake and the Kenaga rake, states the difficulties which he found in practice incident to the old form of rake, and which he states were overcome in the Kenaga rake, as follows (Rec., p. 107): "The difficulty is this: you put horses onto a thing like this rake, with a boy on each one; first one horse will go ahead and then the other, and then the horse, not having anything to guide him, is liable to get around onto these rake-teeth. Then if you run into anything with the rake-teeth, and get stuck in any way, the horses have to be turned clear around and pull the rake out backward before you can get out. I have seen all this myself and know how it works. In pulling the hay onto the ricker teeth with nothing to guide the horses, excepting with a boy on them, or a man, they are liable to pull cross-ways and break the teeth of both the rake and the ricker, and then after the hay is pulled onto the ricker teeth there is no way of backing out without turning the horses around and pulling back the rake; then, when you start out for a new load, you have got to turn clear around to pick up any loose hay that has been dropped or missed."

From this testimony of disinterested witnesses, who have practically operated both the old form of drag rake and the Kenaga rake, and indeed from the testimony also of defendants' witness, Mr. Dain, it conclusively appears that a rake made in accordance with the Kenaga invention effects a saving over the old drag rake equal to the wages of one man or boy; and besides this, we submit, it has also been fully proven by the testimony of these witnesses, who have

made the tests, that the Kenaga rake possesses a working capacity of from one-third to one-half more hay, according as the rake is used in light or in heavy hay.

Against this array of witnesses who give in straightforward way the results of their farm experience, the defendants can urge simply the statement of their expert, Mr. Bates, who glibly swears that the Kenaga invention is merely a step backward in the art and attended with no good results, but who confesses, upon cross-examination, that he has had no experience whatever with this class of invention, and has never seen a drag rake in operation. (Rec., p. 168.) In order to support his theory, this witness alleges that the poles of the Kenaga rake, because of their rigid attachment to the rake-head, will cause the teeth to be so raised off the ground, when attempt is made to back the rake, that the load of hay will move back with the rake instead of escaping therefrom; and furthermore, that in going back from the stack to the field the poles will be raised up under the horses' chins, and the weight of the poles will so oppose the raising of the teeth that "it will be impossible to raise the teeth more than a little way off the ground;" the chief disadvantage supposed, by this witness, to result from this construction being to prevent the horses from going back to the field on a trot. (Rec., p. 165.) On cross-examination, however, Mr. Bates if forced to admit that if the poles of the Kenaga rake are extended to a proper distance with respect to the front of the horses, the backing operation can be effected withou lifting the rake-teeth (Rec., p. 171), and that the weight of the load would allow the rake-teeth to move backward without being raised from the ground. So also this witness on cross-examination, when speaking of the rake shown by the "Exhibit Acme Lithograph" which he says is not a material departure from the Kenaga patent (Rec., 173), admits that it would be an improvement over the old drag-rake (Rec., pp.

172 and 173), and that the rake could be handled better when the poles are employed than it could without them. The fallacy of this theory of a witness who confessedly has never so much as seen a drag rake in operation, and who upon cross-examination is forced to admit his error, is abundantly proven by the practical results obtained with rakes made in exact accordance with the Kenaga patent, as detailed in the testimony above referred to; but in this connection we would also call attention to the pertinent answers to questions directed to this point. Mr. Kirk, when asked whether any difficulty is experienced in backing the rake-teeth from beneath the load, said (Rec., p. 48): "There is no difficulty experienced in backing the rake from beneath its load, as shown in the Kenaga device. The horses encounter no difficulty from the poles, for the reason that the horses are out and from the poles some distance, and only connected to the poles loosely by a chain or breast-strap, which allows the end of the tongue to vibrate up and down, in a vertical direction, two feet or more, and not interfere with the horses' necks." This witness, when asked "if any difficulty is experienced in proceeding to the field at a smart pace when the rake is emptied," said: "There is no difficulty, for the reason that the driver's seat is located on the rake in position to allow the teeth to come onto the ground, but only lightly, and the teeth of the rake being large and turned up at the points, will pass over ordinary obstructions in the field without catching, even when heavily loaded. When empty it would be almost impossible for the teeth to run into the ground." He also adds, in this connection: "They possess the advantage of gathering any loose hay that may have been left on the meadow, and a rake without any device for lifting the teeth is preferred by many farmers for this reason." (Rec., p. 49). When asked, upon cross-examination, whether it would not be dangerous "to drive over an ordinarily rough

meadow with the Kenega rake and put the horses on a trot," he said: "Of course, on a very rough meadow, the teeth would be more liable to catch in the ground than on smooth meadows, but it is not usually the custom to trot horses to rakes of this kind, as they can easily do enough work in a day and be walked to and from the field or stack, in gathering and hauling the hay. I would like to state that horses are not usually trotted, when worked, to any kind of a farm implement or machine."

It appears from the testimony of Mr. Kirk (Rec., p. 28) that aside from the drag rake, between which and the Kenaga rake the above comparison has been made, there was in use at the time of the Kenaga invention but one other form of rake adapted to operate in connection with the modern type of hay rickers or stackers, which is illustrated by complainant's Exhibit ("Kirk Exhibit C"), and is what this witness designates as a "shove rake." With regard to this rake which, so far as the record shows, has not been used to any considerable extent, Mr. Kirk testifies that its price is nearly or quite double that of the Kenaga rake (Rec., p. 28), and states his experience with this type of rake as follows (Rec., p. 26): "In the years 1880 and 1881, I also made a few rakes, with trucks and tongue, providing means whereby a team of horses could be hitched directly behind the rake, and shove the rake with the load, and guided by means of the trucks and rudders, something on the principle of a header for harvesting grain. The objections I found to this kind of a rake were its weight, and necessarily being very long and unwieldly, it required a strong, expert man to operate them, and by reason of the horses being hitched so far in the rear of the load, made the draft very heavy and, and in uneven meadows, when the rake became loaded, if the wheels or truck on which the driver sat would be on higher ground than the rake proper with the load, the line of draft would be such as to raise the

driver, truck and wheels off of the ground and prevent the rake from being shoved along with the load, as desired. It was also impossible to get the hay from the corners of the fences, as it was necessary to begin to circle before getting to the corner in order to make the turn."

In stating the cost of operation of this shove rake, as compared with the Kenaga rake, the witness says (Rec., p. 30): "In operating the shove rake as per 'Exhibit C,' it requires a man; in operating the drag rake, as per 'Exhibit Kirk Drag Rake' it requires two men or two boys, 12 to 15 years old; in operating the Kenaga rake it would only require one of those two boys. The two boys are usually hired for about the same price as one man; it is therefore shown that the cost of operating the Kenaga rake is but little more, if any, than one-half the cost of operating either of the other two rakes." He also states (Rec., p. 30), in comparing the capacity of the Kenaga rake with the shove rake, that, as the result of his experience, the Kenaga rake is able to gather up from a third to a half more hay.

No attempt whatever has been made to controvert this testimony of Mr. Kirk with regard to the relative cost of manufacture and operation of the shove rake and the Kenaga rake, and in regard to the relative capacity of these two types of rakes.

We submit, therefore, that it is conclusively proven by the record that not only does the Kenaga invention remedy all the defects incident to the old forms of sweep rakes, but that it enables this class of rakes to perform from a third to a half more work per day and at a saving of at least one-half in cost of operation.

THE PRIOR ART.

The defendants have set up certain prior patents, some twenty or more in number, antecedent in date to the Kenaga patent, and which, it is alleged, either disclose the exact

invention defined in the Kenega patent, or show such a state of the art that mere mechanical skill and not invention was required to produce the Kenaga improvement. We have, therefore, to consider whether, despite these prior patents, the horse hay rake, described and claimed in the Kenaga patent, is new and useful under the statute.

As many of these prior patents show merely variations of the same type of machine, they will, for convenience of consideration, be classed under the following groups: First, sweep rakes, having horses attached at their ends. Second, sweep rakes, with horses attached directly in front of the teeth. Third, hay-loading machines; and fourth, corn and cotton harvesters, having the horses separately attached to the machine, so as to walk on either side of the planted row. There are also several other patents which, not falling under either of these classifications, will be separately considered.

SWEEP RAKES HAVING HORSES ATTACHED AT THEIR ENDS.

Under this group are included the patents of Bean, Middlecoff, Hunter, Rumrill, King and Hudson.

THE BEAN, MIDDLECOFF, KING AND HUNTER PATENTS.—Neither of these three patents show any nearer approach to the Kenaga invention than the old form of sweep rake, which is acknowledged in the Kenaga specification. In each of these patents the horses are hitched to chains or ropes at the ends of the rake so that they travel beyond the rake-teeth, and are managed by separate riders. Obviously, therefore, the construction set out in each of these patents is attendant with all the disadvantages incident to the old form of sweep rake, and can have no possible bearing upon the question at issue, further than to show that the statement of the Kenaga patent is true with regard to the location and management of the horses in this type of rakes.

THE RUMRILL PATENT.—This patent shows a hay-gatherer designed to collect hay from the windrow and carry it to the stack. In order to enable this combined horse rake and hay carrier, as the specification of the patent terms it, to carry a larger load, the teeth of the rake are provided with upright plates, and the outer teeth of the rake are provided with standards which serve to better retain the hay upon the rake. In the device the horses are hitched by chains or ropes to the ends of the axle, and no doubt travel in front of the end teeth, and are managed by separate riders in the usual way; but the provision of the guard-plates upon the rake-teeth, the express purpose of which is to retain the hay upon the rake-teeth, would prevent this machine from being used in connection with a stacker, as it would be impossible to back the rake from beneath its load. Obviously the hay-gatherer described in this patent has no provision whereby it can be backed from beneath its load, and even if such provision were made, the backing of the rake would fail to free it from the load because of the device specially designed to retain the load thereon. The light wires or bent wood rods which serve to retain the hay upon the rake extend immediately over the outer teeth and terminate at a point short of their ends. Not only would these bent wood rods or wires be totally unfit to receive the backing strain of a horse's breast-strap, but it is obvious also that if the horses were hitched in the manner proposed by the patent, the rods or wires would be entirely too short to allow any attachment thereto of the breast-strap. Moreover, the fact that the wires or rods are immediately above the rake-teeth, would prevent their performing the function of keeping the horses off the rake-teeth if attempt were made to manage them by a single driver. We submit, therefore, that this patent has no bearing whatever upon the novelty of the Kenega invention.

THE HUDSON PATENT.—This is the patent which is re-

garded by defendants as showing the nearest approach to the Kenaga invention, and as showing a machine capable of being operated for the same purposes and in the same manner as the Kenaga rake; and it is to this patent that a very large part of the testimony of the two witnesses examined by the defendants has been directed. This patent shows a horse rake consisting essentially of a rake-head mounted on wheels and having the ends of its axles provided with swivel hooks to which the horses will be attached. No provision is made for hitching the horses forward, but as the patent expressly states, they are ridden by separate riders and are wheeled around to draw the rake from beneath its load and backward into the field. The operation of this rake, therefore, as it is specifically defined in the patent, corresponds precisely with that of the old drag rake referred to in the specification of the Kenega patent. There are, however, in the rake of this Hudson patent, certain forwardly projecting arms which extend over and in the same vertical plane with the outermost teeth of the rake and terminate at some distance back of the ends of these teeth. These arms have their front ends extending in convenient reach of the riders and are intended to enable the riders to lift the rake-teeth and the load thereon when approaching an obstruction, so that the teeth may clear it; and this is the one and only function assigned to the arms by the specification of the patent. The patent does not specify the exact height of the arms, but provides means for their adjustment with respect to the hands of the riders with reference to various sizes of horses. Nor does the patent specify how far forward these arms project, but Fig. 2 of the drawing shows that they are about three-fourths of the length of the rake-teeth, which are stated by the patent to be about eight feet long. Fig. 1 of the printed copy of the patent does not show the arms as shorter than the rake-teeth beneath them, but this is due to the

error in the photolithograph, which was made from a defective tracing, as is evidenced by the certified copy of the original Patent Office drawing marked "Complainant's Exhibit Hudson Original Drawing," the cross lines upon which show the ends of the arms terminating at a short distance from the ends of the subjacent rake-teeth. It is obvious from the drawing of the patent and from their specifically stated purpose that the arms are designed merely to enable the riders to lift the rake-teeth; hence they are not intended to extend further than would be necessary to bring their ends conveniently within the reach of the riders, and, consequently, would not extend even so far forward as the horses' shoulders. The defendants' witnesses, Mr. Bates and Mr. Dain, have stated very positively that these arms of the Hudson rake will extend fully as far forward as the horses' shoulders, and base their statements, not upon the specifically stated function which these arms are designed to perform, but upon the fact they are shown in one view of the defective photolithographic copy of the drawing to be equal in length to the rake-teeth, which are stated to be eight feet long. As the certified copy of the original Hudson drawing conclusively shows the incorrectness of the photolithograph, it also proves the error of these witnesses who, in the hope of giving to the Hudson machine a capacity for performing an operation for which it was never intended, have foolishly based their statements as to proportions of the parts, not upon the office of such parts, but upon a fact which admittedly has no reference thereto whatever. (Rec., p. 202.) We submit, however, that it is plain, from a mere inspection of this patent, that the rake there shown is utterly incapable of any mode of operation like that of the Kenaga invention. In the first place, the lifting arms of the Hudson rake are so short that if the horses were attached to the ends of the axles, as the patent states they must be attached, the horses would, in backing, strike

against the wheels before exerting any strain upon the ends of the arms. Secondly, the arms are so high that if the horses were hitched to their ends by breast-straps, the tendency in backing would be to tip the rake upward and lift its teeth and load off the ground. Thirdly, the ends of the arms are so far inward, being arranged directly over the rake-teeth, that if the horses were hitched to the arms, and a backing movement were attempted, the horses would wrench or break the arms or their standards. Moreover, if the horses were attached to these arms by their breast-straps, and an attempt were made to manage the two horses by a single driver, the position of the arms would be such that they could by no possibility aid in guiding the horses, or in keeping them off the rake-teeth, for the reason that as these teeth were swung around by the irregular movements of the rake they would be in constant danger of striking the horses' feet. Not only, therefore, does the patent itself state a use and mode of operation for these arms, wholly different from those of the poles defined in the Kenaga patent, but it also shows a construction which would be utterly incapable of practically performing the stated functions of the Kenaga poles. Mr. Dain, the only one of the defendants' two witnesses who has had any experience whatever with this class of hay rakes, when asked whether it would be practical to connect the horses by single-trees and chains to the links on the ends of the axles and by breast-straps to the poles C, and under the ordinary conditions of field operations to satisfactorily work such machine, so that the horses could back the rake from beneath the load, admits that such construction would be objectionable, and also that, under such conditions, unless the horses were carefully handled, there would be constant danger of their swinging against the wheels of the machine. (Rec., p. 205.)

The fallacy of the theory of the two witnesses for the defendants, as to the capacity of the Hudson machine for

operation in a manner totally different from that prescribed in the patent, while apparent, we believe, from the mere inspection of the machine, is demonstrated to a certainty by the testimony of the patentee, Hudson, himself, as to the construction and operation of a machine made by him in accordance with his patent, and by the testimony of Mr. Kirk, as to the results of his experience with a full sized Hudson rake. In the first place, the brief history of the attempts of Mr. Hudson to practically employ and introduce his own invention, is a most significant fact for consideration in determining the question whether this rake is in substance the same as the Kenaga rake, which has admittedly superseded all former types of sweep rakes in the market. Mr. Hudson, when asked how many rakes he had made in accordance with his invention, answered (Rec., p. 36); "Only one large one. There were some two or three models for persons who went west to introduce it. They never returned them, and never did anything with them so far as I know."

It also appears from his testimony that this one rake—the first and last of its kind—was used only part of two seasons, raked only thirty acres of hay, was found unsatisfactory and impracticable for its purpose, and, as Mr. Hudson states, was finally "shoved into a hedge, where it lay for years and disappeared gradually, a piece at a time," nothing being left but the iron wheels and axles, and one clevis, which are embodied in the complainants' "Exhibit Hudson Rake." Mr. Hudson, when asked whether the projecting arms at the sides of the rake worked successfully in practice, states: "Well, I think not, when we run into anything tight. A man on a horse couldn't raise it out of a tussock. A man on horseback didn't have the power he would have on the ground. With a heavy load on we would have to turn round and back out." It may be contended, however, that, although this Hudson invention was a failure for the purposes for which it was designed, that it might neverthe-

less be employed for operation in the same manner as the Kenaga rake. Upon this point the following testimony of Mr. Hudson is also instructive. (Rec., p. 38.)

"Int. 27. Did it ever occur to you that instead of turning the horse around and backing out, the horse might be hitched at the front to the arm C, and that arm be used as a pole to aid in backing the rake?

"Ans. No, sir; I never thought about a thing of that kind. And it didn't extend far enough out. It generally came near the collars.

"Int. 28. In the rake then, as constructed by you, the arm C could not be used to back the rake; is that true?

"Ans. Yes, sir."

On cross-examination also this witness upon this same point testifies:

"X. Int. 46. If you had placed bent irons like those shown in the Kenaga patent No. 259,550, on the outer ends of the poles C of your big rake, you could have attached the horses to them by breast-straps or chains, could you not?"

"Ans. No, sir.

"X. Int. 49. If the whiffletrees had been attached to a cross-bar behind the wheels, then the poles C would have been long enough for hitching the breast-strap of the horses to them, would they not?

"Ans. If they had been put back far enough they would have been long enough, but they wouldn't work because the strain would be sideways and would burst the forward uprights."

In order to settle this question as to the capacity of the rake made in accordance with the Hudson patent for operation in the manner of the Kenaga rake, Mr. John E. Kirk constructed and attempted to operate a rake in accordance with the Hudson patent, using in such construction the wheels and axle and one clevis that had formerly belonged in the only rake made by the patentee, Hudson. Mr. Kirk

testifies with great particularity as to the construction of this rake and as to the manner in which he conducted his experiments therewith. This testimony fully confirms that of Mr. Hudson, not only as to the inoperativeness of the projecting arms of the rake for the purpose for which they were designed, but also as to the utter impossibility of employing such arms for the purpose of backing the rake or for the purpose of enabling a single driver to manage both horses. (Rec., p. 42, *et seq.*) We refer confidently to this testimony of Mr. Kirk and remark, with what entire fairness he sought to demonstrate whether the arms could be used to perform the functions of the projecting poles in the Kenaga construction.

In connection with this Hudson patent, we desire to call attention to the case of *Clough* v. *Barker*, 106 U. S., p. 166, in which the defendants set up as an anticipation of Clough's invention a burner of Horace R. Barker which, it was contended, might without material change be used in the same manner and to produce the same results as the burner of the Clough patent. The court in holding the patent valid considered this defense in the following language: "The testimony as to any additional or supplementary supply of gas in the Horace R. Barker burner amounts really to this only, that if that burner is used now in a way in which it was never designed to be used, and is not shown to have ever been used before Clough's invention, it may be made to furnish a supplementary supply of gas. Its structure was such that, to give full effect to its mode of operation, the surrounding tube did not require ever to be raised so high as not to be in contact with the cone. As it was raised from its lowest position the slit opened, and when the slit was opened to its full extent, the tube was still in contact with the cone, and there was no orifice between them. Any further raising of the tube was accidental and not a part of the law of the structure. The object of raising and lower-

ing the tubes was, by less or greater pressure on the cone, to open or close the slit in the burner. The specification of Horace R. Barker in his rejected application shows that the only object of his burner was to control the flow of gas though the slit in the burner, instead of controlling the flow at the cock or farther back. The spring of the two parts of the burner was intended to carry them away from each other and open the slit when the pressure of the tube against the cone was relieved, while the increased pressure of the tube against the cone closed the slit. Any raising of the tube unnecessarily high, so as to admit of a flow of gas through an orifice between the tube and the cone to the flame, cannot be regarded as amounting to an anticipation of what Clough invented. The structure was not designed for the same purpose as Clough's, no person looking at it or using it would understand that it was to be used in the way Clough's is used, and it is not shown to have been really used and operated in that way."

RAKES WITH HORSES HITCHED IN FRONT.

Under this class of devices fall the patents of Pennock, Wicks, Fowler and Swinnerton.

THE PENNOCK PATENT.—This patent shows merely a sweep rake having the horses hitched in front of the rake-teeth to short bars projecting forwardly from the rake-head beyond the teeth. No provision whatever is made in this patent by which the horses could back the rake from beneath its load, but on the contrary, means are provided whereby the load may be drawn off the teeth. This patent lacks not only the laterally projecting poles of the Kenaga patent, but also the projecting draft-bars, so that it is not even as near an approach to the Kenaga invention as the old sweep rake, upon which such invention is an improvement. In fact, it is apparent from the merest examination

of this Pennock patent, that even were poles attached, the rake could by no possibility be used in connection with a stacking machine.

THE WICKS PATENT.—This patent shows a revolving rake, the load of which is discharged by lifting the rear end of the rake so as to throw the teeth into the ground to insure the turning over of the rake in the further movement of the team. The horses are hitched in front of the rake on opposite sides of the single central pole, and not at the ends or sides of the rake, as in that class of machines upon which the Kenaga invention is an improvement. The rake of this patent is not adapted for use in connection with the stacking machine, but is intended merely to collect such light loads as may be lifted by the operator sufficiently to throw the points of the rake-teeth into the ground, in order that the partial revolution of the teeth may be effected to discharge the load. The Wicks rake is not only destitute of the projecting poles found in the Kenaga improvement, but is also without the draft bars to co-operate therewith, and it is obvious that to apply to this type of rake the projecting poles of the Kenaga patent would not only be useless, but would destroy the mode of operation of the rake specifically set out in the Wicks patent. Not only would it be impossible to use this type of rake in connection with a stacking-machine because of the necessity of driving the horses on to the machine, but as well also because it would be impracticable to back the horses over the accumulated load of hay.

THE FOWLER PATENT.—The rake shown in this patent is almost identical in construction and mode of operation with that set out in the patent of Wicks, and for the same reasons is totally without bearing upon the question of the novelty of the Kenaga invention.

THE SWINNERTON PATENT.—This patent shows a horse

rake having a tongue which, in drawing the rake forward, extends beyond the teeth far enough to allow the horses to be hitched directly in front of the central portion of the rake. The rake is discharged of its load by detaching the rear portion of the tongue from a peculiar kind of fastening adapted to hold it rigidly, and then swinging the horses and tongue around behind the rake, and finally drawing the rake backward from beneath the load. When a new load is to be collected, the horses will be again reversed and brought to their position in front of the rake. It is evident from this patent that the inventor conceived the desirability of directing and managing the two horses by a single driver; but the very fact that he was forced to contrive ingenious mechanism in order to enable the single pole to be swung around with the horses behind the rake should conclusively prove that it was not obvious to him that separate poles at each side of the rake could be employed in conjunction with draft-bars at the ends of the rake to attain the object in view. This Swinnerton rake could not possibly be used like the Kenaga rake in connection with a stacking machine, first, because the load could not be drawn onto the platform of such machine, nor could the horses be backed out over the load of hay in order to free the rake from its load. While, therefore, the Swinnerton rake, like various others that have been considered, may possess the advantage of enabling a single driver to manage both horses, it possesses none of the other advantages due to the Kenaga invention, and could by no possibility be used to perform its functions, and consequently can not be said to show the subject-matter of the Kenaga patent.

THE NICHOLLS PATENT.—This patent illustrates a machine termed by the patentee a "Hay Rake Wagon," in which the horses are hitched to a tongue in the same manner as they are hitched in an ordinary two-horse wagon, such tongue projecting forward from a swivel frame located in front of

the raking and loading mechanism. This hay rake wagon, even if its complicated mechanism were dispensed with, would be totally incapable of use in connection with a stacking machine, for the reason that it would be utterly impossible to deliver the load on the platform of such machine, or to back the rake from beneath its load. The horses in this Swinnerton rake are not located at the ends of the machine, nor are there any draft bars or projecting poles such as constitute the Kenaga invention, and this rake is, therefore, clearly without any bearing upon the novelty of the Kenaga invention.

VARIOUS KINDS OF MACHINES WITH HORSES IN THE REAR.

THE SHOVE RAKE.—Although the defendants have not set out this rake as anticipating the Kenaga invention, it appears from the complainants' record that it was in existence prior to the date of the Kenaga patent.

The court will recall the fact that in this old type of rake the horses are not hitched to draft-bars at the ends of the rake as in the Kenaga device, nor are any poles provided projecting forwardly alongside the rake-teeth, to which the horses, even if hitched to the ends of the rake, might be attached. The construction of this rake, its great cost in manufacture and operation, and the disadvantages incident thereto, have been so fully discussed in dealing with the question of the utility of the Kenaga invention that it seems unnecessary to consider this form of apparatus at any greater length.

THE LYMAN & BALDWIN PATENT.—This patent describes a hay-loader, consisting of a wagon adapted to receive the load of hay and provided with two elevating rakes having short teeth which gather successively small quantities of hay at a time and lift and dump it into the wagon. The horses are not hitched to the rakes at all, but are attached to the

wagon by a projecting tongue in the manner common to farm wagons. The rakes, instead of being placed between the horses, as in the Kenaga patent, are wholly in front of them, and are pushed forward in this position by means of swinging bars that extend backward and connect with the front of the wagon. The rakes in this apparatus are not intended to be backed from beneath their load, but are discharged in a wholly different way, viz: by being lifted over the horses' heads. There is not to be found in this patent, therefore, a single feature characteristic of the Kenaga invention, and without a total reorganization of parts that would utterly destroy the purpose and mode of operation of the Lyman & Baldwin machine, the rakes there shown could not be used to perform the functions of the Kenaga rake.

THE RONEY PATENT.—This patent shows simply a mowing machine attached to the front end of a wheeled vehicle, which is provided with complicated mechanism for driving its cutter-bar. The horses travel entirely behind the cutter-bar and at each side of the vehicle and are attached to draft-bars at the extreme rear part of the machine. This Roney apparatus, failing as it does to show either a rake, or draft-bars located as in the Kenaga device, or forwardly projecting poles such as are used in the Kenaga rake, fails utterly to show either the construction claimed in the Kenaga patent, or any apparatus which could possibly be used to perform the functions of the Kenaga rake. It is obvious also that even were rake-teeth substituted for the cutter-bar in this machine, and even were the complicated mechanism for driving such cutter-bar dispensed with, the only result would be a total destruction of the Roney apparatus without producing any device approximating the Kenaga invention, even so closely as the Shove rake already considered.

THE MASON PATENT.—This patent shows merely double thills designed to be used in place of a single tongue for wagons with the addition of mud-guards standing in front of the wheels of the vehicle to which the thills are to be attached. The invention does not contemplate any new location of the horses with respect to the vehicle, so that even assuming that such double thills were attached to a sweep rake, the horses would be entirely in front of the rake-teeth, and indeed, if the teeth were made of sufficient length to gather hay, they would extend between the horses' feet. The use of these Mason thills in connection with a sweep rake is so obviously impracticable as to require no further comment.

THE PERKINS ENGLISH SPECIFICATION.

This is a specification of a provisional English patent lodged in the British Patent Office on the 4th of September, 1868. In it Perkins declares that his invention consists in certain "Improvements in Elevators or Apparatus to Raise Agricultural Produce into Carts or Stacks." There are no drawings whatever accompanying the specification and, so far as the record shows, no complete patent was ever taken by Perkins, and all rights to such invention were abandoned by him. The specification is apparently in two parts, the first relating probably to elevating apparatus designed, as the specification states, for use in connection with threshing machines, and the second purporting to describe an apparatus designed to elevate a cut crop from the ground on which it lies, onto a wagon or cart. It is this last apparatus which the defendants allege to fully embrace the Kenaga invention; and its description, as given in the specification, is as follows:

"In order to elevate a cut crop from the ground on which it lies onto a wagon or cart, I employ an elevator consisting of a trough-like frame, having, as in an ordinary elevator,

pulleys at each end of the trough, around which endless chains pass. These chains carry cross-laths with teeth upon them, which travel along the trough. The trough is erected in an inclined position, and with its lower end foremost it is drawn over the land. Inclined rake-teeth are fixed at the front end of the trough and these points rest on the land. The crop, as the machine meets it, rises up the inclined teeth, and from the top of this incline the elevating chains take the crop and carry it to the top of the trough, where it is discharged and falls into the cart or wagon which immediately follows the apparatus. The lower end of the trough is supported on a castor wheel or wheels, but the main carrying wheels of the elevator are underneath the trough, and about midway of its length, or the castor wheels may be traveling wheels. A frame-work connects these wheels with the trough, and from them by a driving band, rope or chain, the endless elevating chains are driven. The apparatus may be drawn by horses, one on either side of the fore end of the trough; they are harnessed in shafts or to poles, which are there provided; or it may be worked by horses harnessed quite in front of the machine, but so far separate from each other as to allow of their walking one on either side of the windrow of hay or corn, which lies between them, without trampling upon it.

"The cart or wagon following the apparatus may be drawn by its own horse or horses working underneath the upper end of the trough immediately behind the carrying wheels of the elevator, and the bridles of the cart or wagon horses may be attached to the elevator so as to make them follow in their proper place; or the cart or wagon may itself be attached to the elevator, and be so drawn along behind it; or the elevator may be pushed before the cart. To help the crop up the inclined teeth until the elevating chains take it, I sometimes employ a short set of endless

chains, or one or more revolving barrels. These chains or barrels are provided with spikes or teeth, and they stand immediately over inclined rake-teeth so that the spikes or teeth draw the crop up the incline to the point where the elevating chains take it. Provision may be made for steering the machine independently of the horses, by a lever or other steerage appliance connected with the castor wheel or wheels."

Before considering whether this description is sufficient to destroy the novelty of Kenaga invention, we desire to submit the following propositions of law: First, that a publication of this kind in order to defeat a patent must be in such full, clear, exact and precise terms that the skilled mechanic, without resort to experiment, can construct therefrom a machine which will embody the invention of the patent in suit; second, that the specification must be so clear and exact that, in following it, the mechanic will not only be led to construct, without experiment, a machine embodying the invention of the patent in suit, but will do so inevitably and invariably—that is, he can not possibly construct any apparatus that will not embody such invention; third, that the burden of proof is upon the defendants to show beyond reasonable doubt that the provisional specification describes precisely the invention of the patent in suit, and that every doubt that arises in this connection must be resolved against the defendants.

In support of these propositions we direct attention to a few leading cases:

In the recent case of *Eames* v. *Andrews*, 122 U. S., p. 40 (See p. 66), Mr. Justice Matthews, in delivering the opinion of the court, said:

"The rule governing the defenses alleging the invalidity of the patent by reason of prior printed publications was stated by Mr. Justice Clifford in *Seymore* v. *Osborne*, 11 Wall., 516 (555), in this language: "Patented inventions can

not be superseded by the mere introduction of a foreign publication of the kind, though of prior date, unless the description and drawings contain and exhibit a substantial representation of the patented improvement in such full, clear and exact terms as to enable any person skilled in the art or science to which it appertains to make, construct and practice the invention to the same practical extent as they would be enabled to do if the information was derived from a prior patent. Mere vague and general representations will not support such a defense, as the knowledge supposed to be derived from the publication must be sufficient to enable those skilled in the art or science to understand the nature and operation of the invention, and to carry it into practical use. Whatever may be the particular circumstances under which the publication takes place, the account published, to be of any effect to support such a defense, must be an account of a complete and operative invention, capable of being put into practical operation."

In the case of *Coffin* v. *Ogden*, 18 Wall., 120, the court, through Mr. Justice Swayne, said:

"The invention or discovery relied upon as a defense must have been complete and capable of producing the result sought to be accomplished; and this must be shown by the defendant. The burden of proof rests upon him, and every reasonable doubt should be resolved against him. If the thing were embryotic or inchoate; if it rested in speculation or experiment; if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or an invention which was completed, while in the other case there was only progress, however near that progress may have approximated to the end in view. The law requires not conjecture, but certainty."

Applying the rules as thus laid down by the authorities, to the determination of the question at issue, viz., whether

the Perkins provisional specification fully discloses the Kenaga invention, we believe that this question must be determined against the defendants from a bare inspection of the specification and from the testimony of defendants' own expert witness with regard thereto.

It is obvious that the apparatus referred to in the first part of the provisional specification is so loosely and vaguely described that it would be utterly impossible for a draftsman to construct a machine in accordance therewith. This fact is admitted by Mr. Bates on his cross-examination. (Rec., p. 192.) It is alleged, however, that the second part of the specification is more clear, and Mr. Bates has produced a drawing marked "Defendants' Exhibit Drawing of Perkins' Patent," which he alleges is made in accordance with such part of the specification; but, upon cross-examination, it appears that there are errors even in this drawing. (Rec., p. 192.) It might be admitted, for the purpose of argument, that the drawing is included within the vague and definite language of the Perkins specification, but we deny that this fact can in any sense establish the sufficiency of this specification to disclose the Kenaga invention. First, because there are many different constructions of hay loading apparatus of which a skilled mechanic might make drawings, and which would fall as fully within the language of the Perkins specification as does this drawing of Mr. Bates, but which, beyond a shadow of doubt, fail utterly to embrace the Kenaga invention or anything approximating thereto. Thus, for example, the vague and general statement that "the apparatus may be drawn by horses, one on either side of the fore end of the trough," does not define with exactness any precise position for the horses, which obviously may be hitched at any point from that shown in the defendant's drawing to the front ends of the rake-teeth. So, also, the statement that the horses "are hitched in the shafts or to poles which are there provided," is utterly inadequate

to define any construction, location or arrangement of shafts or poles to which the horses are to be hitched. Mr. Bates admits that the shafts "may be *laterally movable* shafts" (Rec., 196), a construction which defendants' witness, Mr. Dain, as well as all of complainant's witnesses agree would be inoperative for the purposes of the Kenaga invention. Here, then, is one construction admittedly falling within the language of the Perkins specification, which clearly does not embody the invention of the patent in suit. Again, the statement of the Perkins specification "that the horses are harnessed to poles," is, we submit, inadequate as a description of poles corresponding with and performing the functions of the projecting poles of the Kenaga patent. The poles referred to in the Perkins specification may and probably do mean *laterally projecting* poles to which the horses will be harnessed. Such laterally projecting poles, or their equivalents, are absolutely necessary to enable the horses to draw the machine, whereas forwardly projecting poles are not necessary, since in this class of machines, as Mr. Bates admits (Rec., p. 197), it was common to omit any provisions for backing the horses.

So, also, the poles referred to in the Perkins specification may mean short poles extending forward from the ends of the machine and having the single-trees of the horses hitched thereto in a manner similar to that shown, for example, in the Pennock patent. And Mr. Bates admits that such a construction would fall within the language of the Perkins specification. (Rec., p. 197.) Here, again, is another construction admitted by the defendants' expert to be entirely within the language of the Perkins specification, and which does not include the Kenaga invention. Moreover, the fact that the Perkins specification fails utterly to indicate any specific manner of attaching the poles to which the horses will be hitched or any precise position for such poles, leaves so much in doubt that the mechanic, when at-

tempting to follow such specification, is utterly without direction that will enable him to locate or attach the poles in substantially the same manner as they are located and attached in the Kenaga device. Thus, for example, under the vague language of this specification, the poles to which the horses are hitched might, as Mr. Bates admits, be laterally movable poles, another construction which would have no bearing whatever upon the invention defined in the Kenaga patent. The statement at the end of the Perkins specification, to the effect that "provisions may be made for steering the machine independently of the horses, by a lever or other steerage appliances connected with the castor wheel or wheels," would seem to imply that in the absence of such steering mechanism the machine would be steered by the horses, and if this were the case, the poles projecting from the end of the machine would probably be attached in some way so that they would be laterally movable for the purpose of steering the castor wheel. With the possibility, therefore, that the skilled mechanic, when attempting to follow the Perkins specification, may make a number of machines which obviously and admittedly have no bearing whatever upon the Kenaga invention, it can hardly be contended that defendants have complied with that rule of law which requires them to prove beyond reasonable doubt that the Kenaga invention, and it alone, is to be constructed from the Perkins specifications.

The defendants' exhibit drawing of the Perkins patent does not, we submit, illustrate the invention set forth in the Kenaga patent, for the following reasons: First, this drawing does not illustrate a hay rake, but a hay loader, the teeth of which serve merely to deliver the hay to a carrier-belt as fast as it is received thereon, and which would be utterly impracticable for use as a hay rake. Second, with a machine constructed like the Perkins drawing, it would be necessary to employ separate riders for the horses, as it is

not apparent how, in such a machine, the two horses could be managed by a single driver, or where the driver could be located. Third, for reasons already given, when considering the use of thills alone in connection with a sweep rake, the thills shown in the Perkins drawing can not perform the function of the poles described and claimed in the Kenaga patent. Fifth, the position of the thills in the Perkins drawing does not correspond with the position of the poles in the Kenaga rake, nor would they serve to perform the function of such poles.

The fact that the public continued in ignorance of the Kenaga invention for fourteen years after the Perkins provisional patent was granted should be conclusive evidence that it is not to this provisional patent that is due the admitted fact that the old sweep rake has been superseded in the market by the Kenaga invention.

CORN AND COTTON HARVESTERS.

Under this class of machine fall the patents of Patton, Carrothers, Whitney and Currier.

THE PATTON PATENT.—This patent illustrates a corn harvesting and husking machine, adapted to be drawn by horses traveling entirely in front of the machine and separated from each other the distance between the rows of stalks, or about three and one-half feet. The thills wherein the horses are to be harnessed are attached to the machine by bars arranged in a horizontal plane, and adapted to vibrate sidewise to allow the necessary freedom of movement to the horses and prevent their breaking the thills. Behind the horses and in front of the driver's seat is sustained the mechanism for husking the corn. This machine fails to show any of the elements defined in the claim of the Kenaga patent, nor could it by any possibility be made to perform the functions of the Kenaga rake. Moreover, even if

the Patton machine were dismembered and rake-teeth substituted for the harvesting and husking mechanism, such machine would still have absolutely nothing in common with the Kenaga invention, because the horses would be entirely in front of the rake-teeth, thus rendering it impossible that such reconstructed machine should perform the functions of the Kenaga rake, because the horses could not be driven upon the stacker-platform, nor could they be backed over the load when it was necessary to free the rake-teeth therefrom. This patent, showing as it does that it had been proposed to drive horses harnessed in separate thills at a sufficient distance to permit them to straddle a row of stalks, which distance is about the same as horses are ordinarily driven in double teams, is as utterly without bearing upon the question of the novelty of the Kenaga invention as is the Mason patent, which shows the use of separate thills in connection with ordinary vehicles.

THE CARROTHERS PATENT.—In this patent is shown another corn harvesting machine, in which the horses are harnessed in separate thills in front of the machine. The drawing accompanying the patent is out of all proportion, as it would plainly be impracticable to so arrange the shafts that the horses should be separated a distance greater than the distance between the rows of stalks. In this machine the shafts are attached to draft-bars connected to the axle of the front set of wheels, so that a lateral movement is probably allowed to the shafts to prevent their being broken by the irregular movements of the horses, and to permit the machine to be steered. This machine plainly could by no possibility be used to perform the functions of the Kenaga rake, and this would still remain the fact even if rake-teeth were substituted for the harvesting mechanism shown in the patent. In short, this Carrothers patent is as destitute of bearing upon the novelty of the Kenaga invention as is that defined in the patent of Patton last considered.

THE CURRIER PATENT.—This patent, the drawing of which, through an error of the Patent Office, is marked a "Corn Harvester," describes a machine for cutting up and rooting out the stubble of cotton plants. From the front of the machine extend *inwardly bent* duplex poles (or "shafts," as the specification terms them) which serve to separate the horses the distance of a few feet, so that they may straddle the row of plants to be uprooted. This machine is incapable of performing the function of the Kenaga rake, and even if rake-teeth were substituted for the complicated mechanism shown in the patent, such teeth would still be entirely behind the horses, and it would be utterly impracticable to back the horses away from the load of hay, or in short to use the machine in any wise after the manner of the Kenaga device.

THE WHITNEY PATENT.—This patent shows a corn harvester in which the horses are hitched wholly in front of the machine and are separated by inwardly bent duplex poles having only space enough between them to allow the row of stalks to pass back to the cutting mechanism. The substitution of rake-teeth in place of the harvesting mechanism of this Whitney patent would bring the teeth directly behind the horses, so that the machines thus constructed would be incapable of operation after the manner of the Kenaga rake.

INVENTION REQUIRED TO PRODUCE THE KENAGA RAKE.

It is contended, however, on behalf of the defendants, that in view of the state of the art, as illustrated by the foregoing exhibit patents, no invention was required to produce the improvement defined in the claim of the Kenaga patent. In support of this position it is urged that in order to produce the Kenaga improvement it was only necessary to take the poles from an ordinary wagon or the poles from

the Currier or Whitney patents and apply the same to the form of sweep rake admitted by Kenaga to be old in the art.

Complainants' patent is *prima facie* evidence that invention was required to produce the construction set forth therein, and we submit that under all the authorities the burden of proof is upon the defendants to establish beyond reasonable doubt that such construction, with all its advantages, could have been practiced by any person without the exercise of any invention whatever, and merely by reason of his knowledge of such prior art. And to sustain this position, it was necessary for the defendants to show, first, that the several elements defined in the claim of the Kenaga patent were old in the art prior to the date of such patent, and secondly, to show that no invention whatever was required, in view of such prior art, in bringing these elements together into the new relations which they occupy in the Kenaga construction. We will not stop to argue the question whether the defendants have proved that the several elements of the Kenaga construction, when separately considered, are old in the art, further than to direct attention to the fact that in the Currier and Whitney patents no provision whatever is shown or described for attaching the horses to the poles, or for managing both horses by a single driver. On the contrary, the arrangement of the cutting and harvesting mechanism in these patents is such that it is not apparent where a driver could sit upon either machine, and the reasonable presumption would seem to be that the horses were to be managed by separate riders and that the poles were to serve simply the functions defined for them in the patents, viz., to prevent the horses from trampling upon the row of stalks to be cut.

We submit, however, that even admitting the elements defined in the claim of the Kenaga patent to be separately old in other machines, the defendants have failed utterly to

establish the fact that the Kenaga invention could, at the date of his patent, have been practiced by any one familiar with the art by the mere exercise of mechanical skill. We maintain that the converse of this proposition is made apparent, first, from a consideration of the constructions, functions and modes of operations of the various prior structures; second, by the testimony of witnesses, showing that it was not within the knowledge of the skilled mechanic; third, by the fact that although the defects in the old sweep rake had long been recognized and various attempts had been made to remedy them, the Kenaga construction was not produced; fourth, by the fact that as soon as the Kenaga improvement was disclosed to the public it was generally adopted, and has almost entirely superseded all prior structures of sweep rakes.

In the Currier and Whitney machines, as has been already stated, the horses are separated so that they travel no farther apart than do the horses in an ordinary omnibus or wagon. Such being the case, it is plain that although in these machines duplex poles are used to prevent the horses coming together, the method of management of such horses is precisely the same as in all prior structures in which a single pole is placed between the horses. If the horses are managed by a single driver, they are so near together that they can readily be connected by cross check lines, and driven in the usual way, or if separate riders be employed, no difference in the mode of management is necessary. We submit, therefore, that the mere fact that separate poles are employed to keep the horses about the same distance from each other as they ordinarily travel in double wagons, is utterly barren of any suggestion which would lead one skilled in the art to the knowledge of the fact that a team of horses could be driven by a single driver when separated a distance so great as that between the ends of a sweep rake.

Moreover, in the practice of the Currier and Whitney inventions, care must be taken not only to prevent the horses coming together, but it is equally necessary that they shall be prevented from traveling a greater distance apart than three or four feet, since, were they to do so, they would trample upon the rows of stalks. Plainly, therefore, these corn harvesting machines, to the operation of which it is necessary that the horses should not be allowed to travel more than three or four feet apart, must fail to suggest the possibility of a single driver separately managing a team of horses fifteen or more feet apart and at the ends of a sweep rake. Again, the functions which the poles perform in the Currier and Whitney machines, even admitting that they are designed as backing devices, are so totally unlike the functions of the poles in the Kenaga rake, that they would here also fail to suggest the use of poles for the purposes of the Kenaga construction. In these old machines the poles are in front of the harvesting mechanism and not at the ends or sides, as in the Kenaga rake, and the fact that they serve to separate the horses would certainly offer no suggestion as to the location of poles at the ends of a sweep rake, and along side of the rake-teeth in such position that they will perform the entirely new function of preventing the long rake-teeth in their irregular movements from striking and injuring the horses. On the contrary, it is obvious that if the straight or inwardly curved poles of the Currier or Whitney machines were placed at the ends of the old sweep rake, it would be necessary, in order that these poles should perform the office of the poles of the Kenaga rake, that in some way the ends of the poles should be brought so far outwardly from the rake-teeth as to guard the horses against danger of being struck thereby. Of this new arrangement and new function for the poles, the Currier and Whitney patents plainly offer no suggestion to the person familiar therewith. So, also, in order that the Kenaga in-

vention shall be practiced to its full advantage, the old mode of managing the horses by cross check lines or by separate riders is to be dispensed with and an entirely different mode adopted; and here again the Currier and Whitney machines fail of suggestion, We submit, therefore, that it is apparent from a consideration of these prior patents that there is nothing set forth therein which would disclose the possibility of arranging poles at the ends of a broad sweep rake, so that a pair of horses separated a distance of fifteen or more feet could be managed by a single driver, much less do these patents offer any suggestion which would enable the mechanic, without the exercise of invention, to arrange poles at the ends of a sweep rake in such manner that they will serve not merely as backing poles, but as well also to perform the further new functions of guiding and guarding the horses as in the Kenaga device.

In support of the position that the Kenaga improvement can be produced from the prior patents without the exercise of invention, the defendants have examined but two witnesses, Mr. Bates, who admittedly has had no practical experience whatever in this class of machines, and Mr. Dain, who is the patentee of the infringing machine, a traveling salesman for the real defendants in this suit. In view of Mr. Bates' ignorance of this art, we do not deem it necessary to refer to his testimony on this point. While Mr. Dain, in his direct examination, states that it would not require the exercise of invention to apply the poles of the Currier machine to the old sweep rake, he apparently ignores the fact that prior to the Kenaga improvement the supposed impossibility of a single driver managing horses attached to the ends of a sweep rake was an existing obstacle which it was necessary for the invention of Kenaga to remove before it became a question as to how the skilled mechanic could avail himself of such invention. Upon his cross-examination, this witness was asked the following

question (Rec., p. 214): "Do you not have constant difficulty, when selling rakes to the trade, or to farmers who have had no experience with drag rakes having projecting poles at their ends, in convincing them that it is practicable to hitch two horses at the ends of the rake and successfully control them by a single driver?

"Ans. At first mentioning it, they doubt that it could be done, but after explaining it to them, and knowing that the common drag rakes were guided by one horse moving faster than the other, then they understand how it could operate."

Here, then, is this statement of defendants' own witness, that the persons who, of all others, are practically familiar with this art, did not believe, until it was demonstrated, that horses could be managed by a single driver, after the manner of the Kenaga invention. Mr. Kirk, who is shown by the testimony to have been familiar from boyhood with the management of horses and the operation of rakes, and who, prior to the Kenaga invention, had spent a number of years in the manufacture of sweep rakes, and had made attempts to remedy their defects, when asked whether there would be reason for doubting the fact that the horses could be connected to the poles at the ends of the sweep rake, so as to be managed by a single driver, answered (Rec., p. 55): "There would be reason to doubt that horses so hitched to a rake could be practically driven and operated, so attached and so far apart. With all the experience which I have had with rakes of this kind, and as described in Kenaga's patent, I did not think it was possible to so operate a rake until after I had seen the same fully demonstrated; and, in my experience in selling and introducing the Kenaga rake I have found that farmers and dealers alike would doubt that the rake could be operated by one driver driving and managing the two horses in this way, and this they would doubt after seeing our lithographs and circulars containing the testi-

monials of farmers and dealers in implements, that the rake was so easily thus managed."

So, also, Mr. Jesse Hudson, the inventor, who sought to overcome some of the difficulties incident to the operation of the old sweep rake, admits that he never thought of such a thing as hitching horses to the poles of his rake. (Rec., p. 38.) In this connection also the testimony of the witness, Charles H. Crone, is instructive, as he gives numerous instances within his own knowledge showing not only that farmers familiar with the operation of hay rakes doubted the possibility of managing the horses by a single driver after seeing the rakes, but also, in some instances, they actually employed separate riders for the horses after they were hitched alongside the poles of the rake. (Rec., pp. 80 and 81.) From the record, it appears also that it was commonly believed by purchasers of the pole rakes that cross check lines were necessary in order to enable a single driver to control the horses, an arrangement which the testimony also shows would defeat the perfectly successful operation of the Kenaga rake (Rec., pp. 87, 95, 98); and N. S. Johnson, a farmer and former implement dealer, testifies as the result of his experience in selling the Kenaga rakes, that buyers of the rakes not only believed cross check lines to be necessary for the management of horses, but that even then, and with the rakes before them, they did not know that the horses could be handled so great a distance apart until after a trial. (Rec., p. 90.)

Richard Nott, who has been a farmer all his life, in this connection testifies (Rec., p. 105):

"Int. 10. State what, if any, difficulty occurred to you as to the possibility of hitching the horses so far apart, to the poles of that pole rake you first bought, and yet being able to manage the team with a single driver.

"Ans. Well, we thought no one man ever could drive them.

"Int. 11. Why did you think so?

"Ans. Well, we thought the horses were so far apart that no one man could guide them. They would run away, or something or other."

George Pfeiffer, Jr., a carriage and wagon builder, and a man who had had considerable farm experience and had for several years kept a livery stable, and who had manufactured several hundred sweep rakes, was asked with regard to the first Kenaga rake he ever saw, the following question (Rec., p. 107):

"Int. 17. After that rake had been made with the poles thereon and set up in condition for use, state what, if any, opinion you then had or expressed as to the feasibility of using such poles, and yet managing the team by a single driver.

"Ans. I told him (Mr. Kirk) I did not think it would work; did not think a man could handle them. It does not look reasonable even now that a man can handle them."

Here, then, is the admission of defendants' witness, Mr. Dain, that buyers of sweep rakes usually doubt the possibility of a single driver managing horses attached to the ends of the rake, and coupled with it, the testimony of Mr. Kirk, who, although he had been for years familiar with the manufacture and operation of various kinds of rakes and had sought particularly to overcome the objections to the old sweep rake, states not only that he did not believe that it was possible to manage horses at the ends of a sweep rake until he had himself practically tested the Kenega rake, but also gives it as his experience that farmers generally doubt the possibility of operating a sweep rake in such manner, even after seeing the illustration of such rakes and reading the testimonials of those who had used them. And added to this is the testimony of the various witnesses, not as to what they thought in regard to the radical change

proposed by Kenaga in the management of the horses of a sweep rake, but as to what their actual experience had been with such rakes. Nor is it of any importance that these witnesses may not have been familiar with the corn harvesting devices of Currier and Whitney (a fact, however, which the defendants failed to prove), as their doubts existed with the pole rakes of Kenaga actually before them; and certainly these doubts would not have been lessened by any inspection of the drawings of machines (belonging to a notoriously inoperative class of devices) in which the horses were managed in the usual way and at a distance apart no greater than that at which horses are commonly driven in double wagons.

The court will observe that this patent of Currier was granted and published to the world March 6, 1860, more than twenty-two years before the patent of Kenaga, and during all this time, as the record shows, inventors were striving to overcome the disadvantages of the old sweep rake, but with so little success that the sweep rake in its primitive form continued to be commonly used. We submit that this fact alone should conclusively refute the assertion that the germ of the Kenaga invention was within such old service or should prove at least that, if there, it required the genius of the inventor to save it from the dry-rot of twenty-two years. It is against reason, against common sense, to suppose that manufacturers would have continued to build the primitive sweep rakes or that farmers would have for years continued to use them, if, as defendants allege, there was during all this time, within their knowledge and easy reach, a structure which could be operated at one-half the cost and which would accomplish from one-third to one-half more work. Couple with this fact the further fact that upon its introduction the Kenaga improvement was immediately recognized as of a great value, recall for a moment the vast saving which it effects for the farmer and the

circumstances that it has practically superseded all other types of sweep rakes, and the absurdity of defendants' assertion that for twenty-two years this improvement was within the reach of ordinary skill, becomes at once apparent. And in the face of all this the defendants offer only the theories *after the fact* of two witnesses, one testifying in admitted ignorance of any knowledge as to the practical working of this class of inventions, and the other admittedly against the results of his own experience. (Rec., p. 214.) In the light of the accomplished invention, and after Kenaga has demonstrated the possibility of a single driver managing a pair of horses separately attached to poles at the ends of a broad sweep rake, in a manner before deemed impossible, the simplicity with which old machines can be reconstructed so as to accomplish the immense advantages of the invention, must stand as an argu nent in its favor, and not against it. The policy of our patent system is to reward the person from whom the public derives the knowledge of the improvement, and we submit that the whole history of this class of inventions points unerringly to the fact that to the invention of Kenaga, and not to these old corn harvesting patents, is due the benefit which the public has derived from the introduction of the pole rakes.

As illustrating the manner in which the courts condemn attempts such as have been made by these defendants, to defeat a meritorious patent by the resurrection of prior devices alleged to embody the invention, but which have never proved of value in practice, we beg to direct attention to a few leading cases, where precisely the questions here involved were at issue.

In the case of *Webster Loom Co.* v. *Higgins*, 105 U. S., p. 580, the patent in suit was for an improvement in looms, and the invention consisted in a combination of elements, all of which were old in looms. There was no change whatever in these elements except in the matter of their

location, but this change, apparently slight as it appeared, enabled the patentee to produce on each loom ten more yards of carpet a day than it was possible to produce in the old looms. Mr. Justice Bradley, in delivering the opinion of the court, made use of the following pertinent language:

"But it is plain from the evidence, and from the very fact that it was not sooner adopted and used, that it did not for years occur in this light to the most skillful persons. It may have been under their very eyes, they may almost be said to have stumbled over it, but they certainly failed to see it, to estimate its value and to bring it into notice. Who was the first to see it, to understand its value, to give it shape and form, to bring it into notice and urge its adoption, is a question to which we shall shortly give our attention. At this point we are constrained to say that we can not yield our assent to the argument that the combination of the different parts or elements for obtaining the object in view was so obvious as to merit no title to invention. Now that it has succeeded, it may seem plain to any one that he could have done it as well. This is often the case with inventions of the greatest merits. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of old elements produce a new and beneficial result never attained before, *it is evidence of invention.* It was certainly a new and useful result to make a loom produce fifty yards a day when it never before produced more than forty yards, and we think that the combination of elements by which this was effected, even if these elements were separately known before, was invention sufficient to form the basis of a patent."

So also in the case of *Consolidated Valve Co.* v. *Crosby Valve Co.*, 113 U. S., p. 157, Judge Blatchford, in delivering the opinion of the court, said:

"In regard to all the above patents adduced against

Richardson's patent of 1866, it may be generally said, that they never were, in their day, and before the date of that patent, or of Richardson's invention, known or recognized as producing any such result as his apparatus or that patent produces, as above defined. Likenesses in them, in physical structure to the apparatus of Richardson, in important particulars may be pointed out, but it is only as the anatomy of a corpse resembles the living being. The prior structures never effected the kind of result attained by Richardson's apparatus, because they lacked the thing which gave success. They did not have the retarding stricture which gave the lifting opportunity to the huddled steam, combined with the quick falling of the valve after relief had come, Taught by Richardson and by the use of this apparatus, it is not difficult for skilled mechanics to take the prior structures and so arrange and use them as to produce more or less of the beneficial results first made known by Mr. Richardson. But, prior to 1866, though these old patents and their description were accessible, no valve was made producing any such results. Richardson's invention brought to success what prior inventors essayed and partly accomplished. He used some things which had been used before, but he added just that which was necessary to make the whole a practically valuable and economical apparatus. The fact that the known valves were not used, and the speedy and extensive adoption of Richardson's valve, are facts in harmony with the evidence that his valve contains just what the prior valves lack, go to support the conclusion at which we have arrived on the question of novelty. When the ideas necessary to success are made known, and a structure embodying those ideas is given to the world, it is easy for the skillful mechanic to vary the form by mechanism which is equivalent, and is therefore, in a case of this kind, an infringement."

We submit, therefore, that, tried by every test known to

ant's patent, it is found, as stated by defendants' expert, Mr. Dain (Rec., p. 198), that "the bodies of the rakes are constructed substantially the same, also the devices to which the horses are hitched by the singletrees." The rake illustrated in each case belongs to that well-known type of broad horse hay rakes or sweeps of the class employed in connection with stackers, which, prior to the Kenaga invention, required for its management separate riders for the horses attached to the ends of the rake. The defendants' rake, however, like that of the patent, possesses a mode of operation radically different from that of the old form of broad sweep rake, inasmuch as it is capable of being forced from beneath its load by the backing of the horses located at the ends of the rake, or of being advanced and turned under the management of a single driver. Every disadvantage incident to the old form of sweep rake has been overcome alike in defendants' rake, as in the rake of the Kenaga patent, and, as admitted by defendants' witness, Mr. Dain (Rec., p. 211), every advantage incident to the novel features of construction introduced by Kenaga are accomplished as well also in the defendants' rake. We believe that it must be apparent upon the barest inspection of the two machines, that the new and distinctive operation in each is due solely and entirely to the features which they possess in common. In each there are poles at the ends of the rake-head, which project forward, upward and outward therefrom, so that their free ends are in position to allow the horses to be hitched thereto by their breast-straps; in each these projecting poles are of such stiff material and so held against movement in lateral direction that they may withstand the strain in the backing operation; and in each the front ends of the poles project at such distance from the rake-teeth that when the horses are hitched thereto the poles will serve not only as a means for backing the rake from beneath its load, but as well also will perform during

the operation of the rake the further function of guarding and guiding the horses, so that a single man or boy is enabled to manage both horses. Every word in the description of the Kenaga patent is applicable as a description, so far as it goes, to the defendants' rake, and every function performed by the rake of the patent is in like manner performed by that of the defendants. It is true that the inner ends of the projecting poles in the defendants' rake are attached at some distance from the ends of the rake-head, and brace-bars are employed to give increased strength to these poles, but it is obvious, as admitted by defendants' expert (Rec., p. 169), that this slight change in the location of the inner ends of the projecting poles and the additional brace-bars is an immaterial difference.

A single other difference is found to exist between the defendants' rake and that of the Kenaga patent, this being that in defendants' rake the projecting poles are attached to the rake-head by a hinged connection, which allows to them a limited vertical movement, whereas, in the Kenaga rake, the inner ends of the poles are shown as rigidly attached to the rake-head; and it is contended, on behalf of defendants, that this difference is such as to relieve them from the charge of infringement. It is also urged that certain advantages are due to the employment of a hinged connection between the projecting poles and the rake-head, inasmuch as the free vertical movement thus allowed to the projecting poles will prevent their outer ends from striking the horses' necks under some conditions, and will, when the rake is empty, allow the teeth to be raised from off the ground. It will be observed, however, that notwithstanding this hinged connection, the poles in the defendants' machine have *laterally* the same rigidity as the Kenaga poles, and that for backing purposes and for the guidance of the horses and for guarding them with respect to the rake-teeth, the poles of defendants' machine operate precisely in the

same way as do those of the patent. The defendants' poles are no less stiff poles because hinged, since, as we have already shown, the term "stiff," as used in the Kenaga patent, has no reference whatever to the connection between these poles and the rake-head and even this term is omitted from the claim and cannot be read into it. Admitting for the purpose of argument, that the hinged connection employed in defendants' rake gives to it all the advantages contended for, we submit that this fact can in no wise serve to avoid the charge of infringement. In the first place, we believe that it must be apparent from the common knowledge of the well-known alternative modes of attaching the inner ends of tongues or poles to vehicles either rigidly or by hinged joints that the construction of the defendants' rake is the merest mechanical equivalent for that of the patent, but whether this be so or not, we submit that there is no better established principle of patent law than that a defendant who has appropriated, without right, the invention of a patent, shall not be allowed to escape the charge of infringement by alleging that his machines embody improvements over the patent in suit or by claiming immunity under subordinate patents that may have been granted for such improvements.

In this connection we call attention to a few cases where precisely the question here involved was presented for decision.

In the case of *Blake* v. *Robertson*, 94 U. S., p. 728, the patent in suit was for the well-known "Blake crusher." The defendants, omitting the iron rods and levers shown in the patent, used a confined column of water and a safety valve, which was alleged to possess certain advantages. The court, through Justice Swayne, found infringement and said with respect to the alleged good effect incident to the use of the valve: "But, if this were so, the valve would be only an addition and an improvement of the machine. The

valve, therefore, is, in any view, quite immaterial to the inquiry we are pursuing. Where an original machine and an improvement upon it are both patented, neither patentee can use what does not belong to him, without the requisite authority from the owner. The appellants have embodied all the ideas of Blake's invention in their machine; the valve which supplemented it, whether good or bad, is outside of the case, and cannot affect the result."

In the case of *Clough* v. *Barker*, 106 U. S., p. 166, the court, by Justice Blatchford, after recognizing the various differences in structure between the defendant's gas-burner and that set forth in the Clough patent, announced its conclusion as follows: "The defendant's valve arrangement must be held to have been an equivalent for that of Clough to the full extent to which that of Clough goes, involving perhaps patentable improvements, but still tributary or subject to the patent of Clough.

"Recent decisions of the Supreme Court to like effect will also be found in the following cases, among others: *Lake Shore R. R. Co.* v. *Car Brake Shoe Co.*, 110 U. S., 229. *Imhauser* v. *Buerk*, 101 U. S., 674; *Yale Lock Co.* v. *Sargent*, 117 U. S., 540; *Consolidated Valve Co.* v. *Crosby Valve Co.*, 113 U. S., 157; *Morey* v. *Lockwood*, 8 Wall., 230; *Mason* v. *Graham*, 23 Wall., 275; *Ives* v. *Hamilton*, 92 U. S., 431; *Loom Co.* v. *Higgins*, 105 U. S., 591; *Sharp* v. *Stamping Co.*, 103 U. S., 250; *Parks* v. *Booth*, 102 U. S., 96; *Bates* v. *Coe*, 98 U, S., 31; Cawood Patent, 94 U. S., 695; *Blake* v. *Robertson*, 94 U. S., 728."

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CLERK

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, A. D. 1890.

NO. 345.

THE ACME HAY HARVESTER COMPANY,
Appellant,

vs.

STEPHEN MARTIN, THOMAS MARTIN, CHARLES O. SMALLEY, JOSEPH B. DUNCAN and CHARLES O. PETERS,
Appellees.

BRIEF FOR APPELLEES.

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Several subdivisions are mentioned. Subdivision (*a*) refers simply to the fact that the court found that poles or tongues had been applied to all sorts of vehicles for backing purposes for time out of mind. This is certainly correct.

(*b*) That the invention set forth in the Kenaga patent does not consist merely in attaching to each end of a rake head a pole or tongue, but in a certaian peculiar way—"that is to say, with their ends projecting *outwardly*, as well as forwardly and upwardly."

The Currier patent, p. 228, is sufficient answer to this contention. Fig. 1 shows that the front end of each one of the half poles projects outwardly; Fig. 2 that they project upwardly; and both figures that they project forwardly; and, as quoted hereinafter, Kirk agrees that these Currier half-poles could be used in place of Kenaga's without change, so that the court, in this respect, did not misapprehend the Kenaga patent.

(*c*) The claim of the Kenaga patent defines as an element of the combination, the projecting poles C C. These poles are the Currier poles, and were not misapprehended by the court.

Second—That the court erred in finding the subject matter set forth in the Kenaga patent was devoid of patentable novelty in view of the prior common use of poles and thills in vehicles. This assignment is also a little vague. The court found the use of poles and tongues, including the old form of half poles, selected by Kenaga, was not only old as applied to vehicles, but also to various agricultural implements, and single poles to horse rakes.

(*a*) It is insisted that Kenaga developed a new function in guarding the horses against contact with the rake teeth. There can be no question but that Hudson and

Rumrill had this guard. Assuming it to be a new function, necessarily also assumes that a horse has not sufficient intelligence to keep off from the rake teeth without something to knock him off.

(*b*) That invention was required to reduce expense in operation, and in the production of a greater amount of work. This begs the question, as it is admitted that Kirk's old push rake and Swinnerton's old pivoted tongue rake were both run by a single driver without the expense of the extra boy, and the assertion that one-third more work can be done is not sustained by the proofs, for while several witnesses assert this, no one of them is able to explain how, with the same team and a tongueless sweep rake of the same width, it can be done; while Mr. Dain explains, p. 199, A. 10, how more work can be accomplished with a tongueless rake, because with that the horses can be trotted back into the field, while the horses cannot be trotted with pole rakes like the Kenaga.

A point is also attempted to be made for the patent by dispensing with the use of two boys by the employment of one driver. The witnesses all agree that the boys were only paid half price, so that the one driver who took the place of the two boys cost just as much as the boys did. Besides this, this saving is attributed by the patent and by the witnesses to a new arrangement of the lines, which new arrangement is not patented and is not any part of the claim.

An attempt is made all the way through to confuse the lines with the backing poles and to make a different invention from that stated in the claim. The claim is utterly without reference to hitching or to boys, and the witness Crone, page 81, A. 27, says that the Kenaga rake is sometimes used with two boys riding it. The statement of the

claim is, "for hitching the horses forward, whereby they may back the rake from beneath its load." Mounting boys on the horses does not detract from this operation.

Third—The court erred in the finding that in view of the Hudson patent there was no invention required to produce the Kenaga device. The language of the court, p. 15, in respect to the Hudson patent, is very clear and speaks for itself. The court simply found that as a matter of fact the Hudson poles would so far guide the horses as to keep them off from the rake. This is certainly proved, and the attempt to foreshorten the Hudson poles so that they would strike the boys' legs, contrary to the showing of the drawings, will hardly be accepted. There is much said in appellant's brief about the Hudson patent; an old rake made by Hudson, and a reconstructed rake, mounted on fourteen-inch wheels, by Kirk. It is perhaps sufficient to say that appellees did not set up knowledge in Hudson, or introduce any old rake made by him. They relied solely on the patent, as they had a right to do under the statute. In making his machine, Hudson did not follow his patent, and Kirk did not follow the patent in his reconstructed machine, so that all that testimony may be laid aside as outside of the case and utterly worthless.

The contention of appellees was, and is, that it did not require invention to place the hooks *c* of the Kenaga poles, shown in the patent, on the end of the Hudson poles, which hooks would bring the Hudson poles around in front of the horse collars for breast-strap attachment; or that following the rake shown in the Acme lithograph, in which these hooks are not used, it did not require invention to attach the rings there shown to the Hudson poles. In coming to this conclusion the court was clearly right.

The front ends of the Hudson poles are adjustable as to height so that they can be brought to any desired position, and there is no statement given in his patent by Hudson as to the height of his rake-head or frame at the rear end. He simply says that it is there to prevent the hay from going over beyond the rake-teeth. Kenaga has a rake-head for the same purpose, and it may be just as high as Hudson's, or Hudson's may be just as low as Kenaga's. They are both there for the same purpose, both have stiff poles attached to them, and either may be made high or low, especially if the front ends of the poles are adjustable as to height.

On page 9, of appellant's brief occurs this statement: "And yet the defendants, in their efforts to belittle the "Kenaga invention, strenuously urge, in the face of the "plain meaning of this specification, that the only purpose "of such invention was to provide some means of back-"ing the rake."

This court in *R. R. Co.* v. *Mellon*, 104 U. S. 112, 118, held that patent suits were to be tried upon the claims and not upon the specification, and that language found in the specification could not be used to enlarge the scope of the claim as finally allowed by the Patent Office.

What appellees are strenuously trying to do is to hold appellant to its claim. The claim states the combination to be for the purpose of backing the rake, and we only insist that appellant itself shall comply with the law and confine itself to its own claim, and not be permitted to import the specification into the claim so as to change its character or scope.

On page 13, appellant asserts "That thills without "the use of guide poles cannot be practically substituted "for the poles of the patent, we submit would outweigh

"the statement of the specification as to such equiva-
"lency." Appellant is here attempting to dispute its own patent.

A whole chapter is devoted to the subject of thills, and to the attempt to get rid of the specification itself. The destruction of this part of the specification is essential to appellant's new theory that the patent is not for any kind of backing poles located at the ends of any kind of a sweep-rake, but is for special poles projecting forward, upward and *outward;* the "outward" being the supposed distinguishing feature; and as thills cannot be projected *outward*, the destruction of the equivalency of thills becomes essential to appellant's case, but facts are not thus easily set aside to accommodate a pet theory.

This theory is developed more at length on page 15 of appellant's brief, where it is insisted that the claim is for the special poles which are old in the art, to a special sweep-rake, which is also old in the art. It is respectfully submitted that monopolies cannot be carved out in this way, for if they could, a great variety of patents could be obtained for applying these same poles or other poles to other forms of rakes, which the law does not tolerate.

On page 60 of appellant's brief, the case is summed up in six points.

The first relates to driving the team, which is entirely outside of the claim.

The second relates to the outward projection of the poles, which we have seen was old in the Currier half poles, and which cannot be true in relation to thills which are stated in the patent to be the full equivalent of the half poles.

The third relates to guarding the horses and guiding them away from the rake teeth. This, as we have seen,

was old in Rumrill and Hudson, and also that it ignores the intelligence of the horse.

Fourth: that the old sweep rakes were capable of doing only two-thirds of the work of the Kenaga rake. This we have seen is untenable, first because it appears impossible upon its face when the same team and the same length of rake are used; second, because no witness has been able to explain *how* it was done; and third, because the comparisons have all been made with Kirk's old iron runner rake, which had neither wheels nor driver's seat, and which required an extra man to operate it.

Fifth: because that prior to the introduction of the Kenaga rake, people did not *believe* that one driver could handle two horses located so far apart. That this is untenable on the point which appellant attempts to make, appears from the fact that everybody gave up their previous opinions as soon as they saw it tried. It is a mere matter of education, and has nothing to do with mechanical construction. And, because the specification and the witnessess attribute this to the arrangement of the lines; most of the witnesses, however, agreeing that the arrangement of lines, set forth in the specification, was not used; that what was practically used was two lines for each horse, the same as is used for single horses in carriages and elsewhere.

Sixth: That the rake superseded other sweep rakes to a large extent. This is considered by the court, page 15, where the court, following the doctrine of *Gardner* v. *Herz*, 118 U. S. 180–190, held, that while the rake might be a better rake, improvement was not necessarily invention.

The witnesses also attribute this change in demand to other features as well; to wit: the mounting of the

rake on wheels, and locating the driver's seat so that the driver's weight can be utilized to keep the teeth off from the ground when the rake is traveling empty. It is assuming more than the record justifies to attribute the increased demand for sweep rakes to backing poles alone.

The defenses set up below were: first, that the patent does not disclose a patentable subject matter; second, that in view of the prior art the patent is void for want of patentable novelty; and third, non-infringement.

The court below considered the first and second together, or as one defense, and having found this issue of want of novelty for the appellee; it did not, as a matter of course, consider the question of infringement.

The defense of non-infringement is again presented, with the understanding, of course, that in the event of this court sustaining the court below, the question of infringement will not require consideration.

Believing that the defense of want of novelty can be more clearly presented under the original division of *prima facie* want of novelty, and want of novelty in the patent when considered in relation to the prior art, the division between the two is here continued, notwithstanding the fact that they may be considered together, or treated as one, with great propriety

I.

THE PATENT DOES NOT DISCLOSE A PATENTABLE SUBJECT MATTER FOR THE FOLLOWING REASONS.

1. Tongues or poles are prehistoric.
2. Their old and only use is for guiding and backing.
3. They are the only devices known in the arts for these purposes.

4. The tongues are applied in an old and common way.

5. Kenaga could not select anything else for backing his rake.

6. Half, or separated poles, are old.

7. Poles at sides or ends are old; they are

8. Old devices to an old use, as shown and described.

9. Equivalent thills are also old.

10. Separate pairs, one for each horse, are old.

11. The mode of attaching is not described; any old method may be used.

12. Poles and thills for backing other horse rakes are old; and, are

13. Old in the same class of rakes.

14. Only one form of rake claimed.

15. Poles do not render any different services in Kenaga's rake than that elsewhere rendered by them.

16. Kenaga's form of rake, with its hitching bars BB, is old.

17. Kenaga's form of separated half poles is old.

That the selection and putting together of these old devices does not amount to invention or to patentability, see:

Ralston v. *Smith*, 11 H. of L. Cases, 223.
Harwood v. *G. N. Railway Co.*, do. p. 682.
Bush v. *Fox*, 5 do. 707.
Envelope Co. v. *Seymer*, 94 C. L. 173.
Tetley v. *Easton*, 2 C. B. 706.
Phillips v. *Page*, 24 How. 164.
Brown v. *Piper*, 91 U. S. 41.
Heald v. *Rice*, 104 " " 755.
Thompson v. *Boissellier*, 114 U. S. 11, and cases there cited.

I*a*.

The patent is for a mere aggregation, because:

1. The rake with its end draft-bars is an old and operative implement without poles.

2. The same poles are old and have the same operations elsewhere that they do here.

3. There is no co-action between the parts.

4. The rake is the thing to be backed, and is not an element of a combination *for backing*.

5. The draft-bars, BB, are no part of any combination for hitching the horses forward or for backing the rake.

6. The draft-bars are out of action in the backing movements.

7. The poles do not act in drawing the rake forward.

8. Rakes without poles are separately sold.

9. Poles without rakes are separately sold.

That the assembling of parts which perform the same duties elsewhere that they do in their new relations, is not a legitimate combination, see:

Morris v. *McMillin*, 112 U. S. 248, and cases there cited.

That putting poles to an operative rake does not amount to patentable invention. See:

Hollister v. *Benedict*, 113 U. S. 73.

That making an old machine better is not, *per se*, invention. See:

Smith v. *Nichols*, 21 Wall. 119.
Roberts v. *Ryer*, 91 U. S. 159.
Dunbar v. *Myers*, 94 U. S. 193.
Burt v. *Erory*, 133 U. S. 349.

That the court will take judicial notice of such common things as tongues and thills. See:

Terhune v. *Phillips*, 99 U. S. 592.
King v. *Gallun*, 109 U. S. 100.
Phillips v. *Detroit*, 111 U. S. 606.

That neither skill nor selection amount to invention. See:

Phillips v. *Detroit*, 111 U. S. 607.
Hollister v. *Benedict*, 113 U. S. 73.
Gardner v. *Herz*, 118 U. S. 190.

If appellant's position is sound, then Currier and others can be enjoined from selling half poles to be applied to old horse-rakes, and also from using them.

The absurdity and illegality of such a position is well shown in *Heald* v. *Rice*, 104 U. S. 755.

II.

THE PATENT IS VOID IN VIEW OF THE PRIOR ART, FOR WANT OF PATENTABLE INVENTION, BECAUSE:

1. Separately attaching horses to a rake is old in Pennock of 1827.

2. Horses at ends of rake is old in King, 1866; Middlecoff, 1869, and Bean in 1873.

3. Guiding and backing poles are old in Lyman & Baldwin 1848, Fowler 1863, Swinnerton in 1867, Nichols 1868, and Wicks 1868.

4. Poles *or* thills, at the sides of a rake, are old in Perkins' English Patent 1868.

5. Half or team separating poles are old in analogous machines, in Currier 1860, Whitney 1871, Carrothers 1872.

6. Separating pairs of thills are old in Mason 1865, Patton 1870, and Perkins 1868.

7. It is old to use rakes in raking hay and transporting it from field to stack. See: Townsend 1850, Rundell 1866, Bean 1873, and others.

8. It is old to use fender at sides, and is shown in Rumrill 1864, and, substantially,

9. Old to do all that Kenaga can do, in Hudson 1869.

Minor Points.

Lines. The arrangement of the lines is one which one farmer, at least, fell into without instruction.

Lines with seat appear to be the means by which boy riders are dispensed with, and they are not parts put in the combination.

A single driver is the rule, and riders are the exception.

Saving. The saving comparisons are all made with Kirk's old 1882 rake, with cast-iron runners, which require an extra man to pull them back.

One farmer at least raked hay a third faster with the old rake than with the new.

Most, if not all, of the others attribute part of the advantages to *wheels and seats.*

Kirk's 1886 rakes have a lever attachment for raising the front ends of the teeth.

No saving of time can be realized by backing and turning at the stacker, or in turning and pulling.

No injury to horses by hitting the teeth of the rake has been shown for rakes without poles.

Stackers. Any rake without poles or with poles in front, will deliver hay to a derrick or Wick's stacker.

Side poles, or other poles, would be in the way with the Bean Stacker of 1873.

One form of rake with one kind of stacker is not sufficient to differentiate the rake alone.

Many purchasers and users of these rakes do not have any stackers at all.

A stacker cannot be brought into the case to strengthen a patent for applying poles to a rake.

A stacker cannot be used to classify rakes. Its utmost use is to show one possible advantage.

Kenaga's invention. *Prima facie*, Kenaga's invention is for attaching stiff poles rigidly to a sweep or drag-rake, but not to a horse-rake.

In view of Perkins' English Rake, it simmers down to dispensing with an elevator in rear of the rake.

In view of Hudson, it comes down to providing means at the ends of the poles for attaching the usual breast-straps.

Kenaga has not made any such improvements, or added anything to the art, or to the circle of common knowledge, which entitles him to a monopoly of applying poles or thills to one kind of old rakes.

III.

INFRINGEMENT.

Appellees and appellant have the same right to the rake without poles.

Appellant applies stiff and rigid poles to an old rake.

Appellee applies hinged poles to the same old rake.

If Kenaga made an invention in applying stiff poles to an old rake, Dain made an independent invention of the same grade when he applied hinged poles to an old rake.

Appellant's adaptation of stiff poles did not require any change of any of the parts. Appellees' adaptation of hinged poles as applied involved a reconstruction of the

poles, a change of the rake-head, and a new attachment.

In appellant's rake, the poles follow the vertical movement of the teeth. In appellees' rake, the poles are independent of the vertical movements.

In appellant's, the teeth cannot be elevated at their forward ends, without also elevating the poles. In appellees' rake, the front ends of the teeth can be elevated till the teeth and poles come together.

Appellant's stiff and rigid poles add weight to the front ends of the teeth. Appellees' hinged poles relieve the teeth from the weight of the poles and transfer it to the team.

Appellant's rake always moves (loaded or empty) with the teeth resting on the ground. Appellees' teeth rest on the ground only when raking.

Appellant's machine is rigid. Appellees' machine is flexible.

Appellant's poles are the Currier poles. Appellees' poles are new ones of Dain's invention. Guiding by poles, in appellees' machine is the same as the Hudson.

The main inquiry is, What has Kenaga done to entitle him or his assigns to a monopoly of *sweep rakes*, with backing poles or thills at their ends?

ARGUMENT.

I.

NO INVENTION.

In considering the question of the want of patentable novelty, the first question that arises is, whether it amounts to invention to put common tongues or poles onto a hay rake or anything else.

Tongues or guide-poles are prehistoric, as they are shown in the most ancient of Egyptian sculptures and hieroglyphs, and have been in common use in all sorts of vehicles, moving implements and apparatus of all sorts and kinds when mounted on wheels or runners.

The record shows that they have been applied to various forms of horse hay rakes, and, as we contend, to the particular form of rake to which Kenaga applied them.

Tongues or poles do not perform any different office or purpose in the Kenaga rake than that which they perform in nearly or quite all other places.

The two purposes for which poles or thills have been used from time immemorial are guiding and backing, and there are no other devices known in the arts whereby these purposes can be accomplished.

If Kenaga had invented some device by which either of these two old purposes or objects could be subserved without the use of the well- known tongues or thills, then he might justly lay claim to being an inventor.

Instead of inventing some new device to accomplish an old object or purpose, he has simply selected both of the old and the only devices known for this purpose. If Kenaga desired to back his rake and to guide his horses or rake at the same time, what had he to do, or what could he do, other than that which he did do: select tongues or thills for such purposes.

The patent shows what are commonly called half-tongues and suggests thills in their places, or, "as their full equivalents." The art shows that these identical half-tongues for the purpose of separating the team, and for forming a working space between them, are very old, and that separate pairs of thills for the same purpose are also very old; so that Kenaga invented nothing in respect to the half-tongue form of the devices which he selected, or of the thills which he has stated to be the full equivalents therefor.

The claim is as follows:

"In a horse rake having the horses independently "attached at the ends of the rake, the projecting draft-bars, "B B, in combination with the projecting poles, C C, for "hitching the horses forward, whereby *they may back the* "*rake from beneath its load*, substantially as described."

In respect to this claim it is admitted that the projecting draft-bars are old and that rakes made in the identical form shown in the patent, with the exception of the projecting poles, C C, are also old. (*pp. 27, 28, 168 A. 31; 215 Q. 120.*)

Appellant's expert Dayton (*p. 112, f. 211*), accurately states the improvement as follows:

"What was old in the rake, described in the Kenaga "patent, was the rake proper, and the projecting draft-"bars to which the horses were hitched. What is new in "the Kenaga patent is the *added elements of stiff poles* "having their front ends arranged in position to be hitched "by breast straps to the horses, so as to enable the rake to "be backed from under its load, and also serving to aid in "guiding the horses, when driven by a single man or boy, "located centrally behind the rake or the equivalents of "these guiding and backing poles."

From these admissions it will be seen that the utmost that can be claimed for Kenaga is, that he added old projecting poles to one particular form of rake, and not that he was the inventor of the application of projecting poles or thills to horse rakes, or the first to apply them to these implements.

It will be seen from the following authorities that patents can not be multiplied in this way; for if it was lawful to select one form of rake for the purpose of combining with it poles or thills, another could select another form and apply tongues or thills to it, and thus each and every known form of horse rake could be selected as a proper subject matter for a similar combination patent; and if any one of them was valid, all of them should be.

"The discovery *of one particular use* of a known ma-
"chine, although *more advantageous* than that formerly
"known, *is not the subject of a patent.*"

Ralston v. *Smith*, 11 H. L. Cases, 223.

The citation is quoted from Higgins' Digest, p. 53.

"I think the law is well and rightly settled, for there
"would be no end to the interference with trade and with
"the liberty of adopting any mechanical contrivance, if
"every slight difference in application of a well-known
"thing should be held to constitute ground for a patent;
"* * * it would be an idle thing, if it were possible,
"to take a well-known mechanical contrivance and by
"applying it to a subject to which it has not hitherto been
"applied, to constitute that application the subject of a
"patent to be granted as for a new invention."

Harwood v. *Great Northern Railway Co.*,
11 House of L. Cases, p. 682.

In *Bush* v. *Fox*, in Exchequer Chamber, MAULE, J., stated the law as follows:

" Assuming that the machine itself is old, the learned " Judge held that *a mere application is not a new manu-* " *facture*, and, therefore, not the subject of a patent; and my " present opinion is, that on the evidence, he was right in " so directing the jury. (Macrory's P. C. 166; 23 L. J. Ex. " 257. Affirmed in the House of Lords, 5 H. L., Case " 707: 25 L. J., Ex. 251; 2 Jur., N. S. 1,029: Macrory's " P. C. 178.)

" The application of a well-known tool to work pre- " viously untried materials, or *to produce new forms, is not*, " in our opinion, *the subject matter of a patent*. The obser- " vations of the court in giving judgment in the recent case " of *Tetley* v. *Easton*, sustains this proposition. Indeed, " *to hold the contrary* might tend to produce *oppressive* " *monopolies in the application of old and well-known* " *implements to new materials*, without any further nov- " elty or merit than the discovery of the material, *or* " *the form into which it is to be worked*. Such a discov- " ery is not, in our opinion, one of a new 'manufacture' " within the statute of James; and a patent for it alone " cannot be maintained. *The Patent Bottle Envelope Co.* " v. *Seymer*, 94 C. L. (5, C. B. N. S.) p. 173.

" The question, therefore, is whether another person " can take the same machinery as was patented in 1853, " for linen and cotton yarn, and obtain a patent for the " application of it to woolen and thread. I quite concur " in the judgment of the Court of Common Pleas, in " *The Patent Bottle Envelope Co.* v. *Seymer*, that the " application of a well-known tool to work previously un- " tried materials, *or to produce new forms, is not the subject* " *of a patent. When a machine is well-known it becomes*

" *in fact a tool.* I am, therefore, of opinion that the " application of this machinery to woolen yarns is not the " subject of a patent. (28, L. J. Q. B., 175: 5 Jur., N. " S. 1025.) *Brook* v. *Aston*, 28 L. J., p. 176, Martin, B.

" *The discovery that a particular advantage* may be " attained by the use of a machine known before, *in a* " *manner known before*, is not an invention or application " which can be made the subject of a patent. (2, Com. " B., N. S , 706: 26, L. J., C. P., 269.) *Tetley* v. *Easton*, " 2 C. B. (89 C. L.) p. 706."

The foregoing authorities are all English; and the law there stated is not only a correct statement of the legal principles applicable to this class of discoveries or supposed improvements, but the same rule of law has been sanctioned by this court, in *Phillips* v. *Page*, 24 How. p. 164, where the law is stated as follows:

" Although the improvements of the patentee may " have enabled the machine to be applied to the purpose " of sawing logs, when before it was applied only to the " purpose of sawing light materials, such as shingles and " blinds for windows; yet, there is nothing in the patent to " distinguish *the new parts of the machine* from the old, " or to state *those parts which he had invented*, so as to " enable the machine to saw logs."

In *Brown* v. *Piper*, 91 U. S., p. 41, the law is even more strongly stated. The court says:

" It is insisted that *the process was never applied* by " the witness *to the preservation of fish* and meats.

" The answer is, that this was simply the application " by the patentee of an old process to a new subject, with- " out any exercise of the inventive faculty, and without " the development of any idea which can be deemed new " or original in the sense of the patent law. *The thing*

" *was within the circle of what was well known before,*
" *and belonged to the public.* No one could lawfully ap-
" propriate it to himself, and *exclude others from using it*
" *in any usual way for any purpose to which it may be*
" *desired to apply it.* This is fatal to the patent.

" *Ames* v. *Howard*, 1 Sumner, 487.
" *Howe* v. *Abbot*, 2 Storey, 194.
" *Bean* v. *Smalwood*, Id. 411.
" *Winans* v. *B. & P. R. R.*, Id. 412.
" *Hotchkiss* v. *Greenwood*, 11 How. 248."

In *Heald* v. *Rice*, 94 U. S. p. 755, the court says:

" What invention could he claim? He uses Morey's
" device precisely as Morey's patent contemplated, and the
" Cornish boiler exactly as it was designed it should be
" used. And in the combination each operates separately,
" producing its own results. *There was no inventive re-*
" *source drawn upon to bring them together.* Could not
" the owners of the patents for the straw-feeding attach-
" ment and the return-flue boiler unite their machines and
" work them together *in defiance of a claim for the combi-*
" *nation?* To ask the question is to answer it. Yet the
" case supposed does not differ from the case as it exists;
" for *the public owned the right to the Cornish boiler, and*
" *was entitled to every use to which a patentee owning it*
" *might lawfully apply it.*"

In the case at bar the public owns both backing poles and sweep rakes.

The same thing, in a different application, is stated in *James* v. *Campbell*, 94 U. S. p. 363.

In *Thompson* v. *Boissellier*, 114 U. S. p. 11, the court, after commenting upon the Constitution and statutes, says:

" So, it is not enough that a thing shall be new, in the

" sense that in the shape or form in which it is produced " it shall not have been before known, and that it shall be " useful, but it must, under the Constitution and the " statute, amount to an invention or discovery.

" To refer only to some more recent cases, adjudged " since these suits were decided below, this principle was " applied in *Vinton* v. *Hamilton*, 104 U. S. 485, where, a " cupola-furnace being old, and a cinder-notch being old, " and the use of a cinder-notch to draw off cinders from a " blast-furnace being old, and the cinder-notch, in drawing " off the cinder from a cupola-furnace, performing the same " function as in the blast-furnace, it was held that the " application of the cinder-notch to the cupola-furnace " would occur to any practical man, and that there was " nothing patentable in such application.

" In *Hall* v. *McNeale*, 107 U. S. 90, a cored conical " bolt, in a safe, with a screw-thread on it, having existed " before, and also a solid conical bolt, it was held to be " no invention to add the screw-thread to the solid conical " bolt.

" In *Atlantic Works* v. *Brady*, 107 U. S. 192, 200, it " was said, that it is not the object of the patent laws to " grant a monoply for every trifling device which would " naturally and spontaneouly occur to any skilled mechanic " or operator, in the ordinary progress of manufactures; " and this doctrine was applied in *Slawson* v. *Grand Street* " *Railroad Co.*, 107 U. S. 649; in *King* v. *Gallum*, 109 " U. S. 99; in *Double-Pointed Tack Co.* v. *Two Rivers* " *Manufacturing Co.*, 109 U. S. 117; in *Estey* v. *Burdett*, " 109 U. S. 633; in *Bussey* v. *Excelsior Manufacturing Co.*, " 110 U. S. 131; in *Pennsylvania Railroad Co.* v. *Locomo-* " *tive Truck Co.*, 110 U. S. 490; in *Phillips* v. *Detroit*, 111 " U. S. 604; in *Morris* v. *McMillin*, 112 U. S. 244, and in

" *Hollister* v. *Benedict Manufacturing Co.*, 113 U. S. 59."

It thus appears that the patent is void upon its face, and even admitting that Kenaga was the first to apply poles or thills to this *particular form* of rake, the patent is unlawful and invalid, and this, whether we consider the patent as presenting simply that which is mere mechanical skill, and not invention, or whether we consider it as a mere aggregation of old devices, each working out in its new position the identical office and purpose which are its previously well-known characteristics.

That the patent is subject to the objection of being for a mere aggregation, as well as to that of want of patentable novelty, appears also upon the face of the patent. The rake in all of its features and parts, with the exception of the poles, is an old and well-known rake and a complete device. The draft upon the rake and all of its workings, with the exception of backing, are just the same in this Kenaga combination as they were before. Its raking qualities, its movable qualities, and its adaptability to deliver hay to a stacker, are in nowise improved, altered or changed. The poles or thills, in their application to this rake, perform no other or different office from that which they had before performed, of affording facilities for backing and guiding the team, offices which they had always before performed, and they are distinct and detachable in present position. They are therefore mere aggregations or adaptations which in no way affect each other. The rake does not gather hay any better than it did before; the poles or thills do not back or guide a sweep horse rake any better than other forms of horse rakes, and do not perform any other or different office in this rake than they did before, when applied to other forms of rake. The rake does not improve or change the operation of the

poles, and the poles do not improve or change the operation of the rake, except that it is more easily backed or taken out from under its load; but this backing feature being well known, and being what poles and thills are for, this improvement, being attributable to the poles alone, cannot be resorted to, to save the patent, as it results from the known use and operation of poles, in the combination named in the claim.

The changes produced in one kind of a machine by applying thereto well-known devices from another kind of machine which operate in the old way to produce old added results, when added to the other kind of machine, do not belong to the category of invention, and it was so held in *Morris* v. *McMillin*, 112 U. S. 248–9, where the court says:

" In view of these facts, which are either matters of " common knowledge or well established by the evidence, " the only field of invention left for the patent to cover was " the application by the old and familiar arrangement of " shafts and cog wheels, of the power of an auxiliary " engine to a capstan, instead of a windlass. A capstan " differs from a windlass in this respect only, that its barrel " or shaft is vertical, while that of the windlass is usually " horizontal. It is plain, therefore, that no such ingenuity " as merited the issue of a patent was required for this " improvement, but only the ordinary judgment and skill " of a trained mechanic.

" The following cases illustrate the grounds upon " which we base this conclusion:

" It was said by Mr. Justice BRADLEY, in delivering the " judgment of this court in *Atlantic Works* v. *Brady*, 107 " U. S. 192: 'The process of development in manufact- " ures creates a constant demand for new appliances which " the skill of ordinary head workmen and engineers is gen-

" erally adequate to devise, and which, indeed, are the " natural and proper outgrowth of such development. " Each step forward prepares the way for the next, and " each is usually taken by spontaneous trials and attempts " in a hundred different directions. To grant to a single " party a monopoly of every slight advance made, except " where the exercise of invention somewhat above ordi- " nary mechanical or engineering skill is distinctly shown, " is unjust in principle and injurious in its consequences.'

" In *Pennsylvania Railroad* v. *Locomotive Truck Co.*, " 110 U. S. 490, Mr. Justice GRAY, speaking for the court, " declared it to be the result of the decisions of the court " that 'the application of an old process or machine to a " similar or analogous subject, with no change in the " manner of application, and no result substantially dis- " tinct in its nature, will not sustain a patent, even if the " new form of result has not been before contemplated.'

" In *Hailes* v. *Van Wormer*, 20 Wall. 353, where the " patentee had taken a fire-pot from one stove, a flue from " another, and a coal reservoir from the third, and had put " them into a new stove, where each fulfilled the office it " had fulfilled in its old situation, and nothing more, the " patent was held void for want of invention.

" In the case of *Phillips* v. *Detroit*, 111 U. S. 604, the " patent sued on was for an improvement in street and other " highway pavements. The improvement consisted in using " round blocks of wood, formed of the sections of small " trees, set vertically upon a foundation of sand or gravel, " and filling the spaces between the blocks with sand or " gravel. The court said that the use of blocks, such as " were described, set vertically, was old, that the founda- " tion was old, and the use of filling between the blocks was " old, and that the only thing left for the patent to cover

" was the bringing together, in the construction of a pave-
" ment, of these three old and well-known elements; and
" held that this did not require invention, and that the
" patent was void. See also *Hotchkiss* v. *Greenwood*, 11
" How. 248; *Phillips* v. *Page*, 24 How. 164; *Smith* v.
" *Nichols*, 21 Wall. 112; *Dunbar* v. *Myers*, 24 U. S. 187;
" *Heald* v. *Rice*, 104 U. S. 737, 754, 756."

In *Hollister* v. *Benedict*, 113 U. S. p. 73, the court says:

" As soon as the mischief became apparent, and the
" remedy was seriously and systematically studied by those
" competent to deal with the subject, the present regula-
" tion was promptly suggested and adopted, just as a
" skilled mechanic, witnessing the performance of a ma-
" chine, inadequate, by reason of some defect, to accom-
" plish the object for which it had been designed, by the
" application of his common knowledge and experience,
" perceives the reason of the failure, and supplies what is
" obviously wanting. It is but the display of the expected
" skill of the calling, and involves only the exercise of the
" ordinary faculties of reasoning upon the materials sup-
" plied by a special knowledge, and the facility of manipu-
" lation which results from its habitual and intelligent prac-
" tice; and is in no sense the creative work of that invent-
" ive faculty which it is the purpose of the Constitution
" and the patent laws to encourage and reward."

In the same case, page 59, this court says:

" Novelty and increased utility in an improvement
" upon previous devices do not necessarily make it an
" invention.

" A device which displays only the expected skill of
" the maker's calling, and involves only the exercise of
" ordinary faculties of reasoning upon materials supplied

" by special knowledge and facility of manipulation re-
" sulting from habitual intelligent practice, is in no sense
" a creative work of inventive faculty, such as the Con-
" stitution and the patent laws aim to encourage and re-
" ward."

In *Thatcher Heating Co.* v. *Burtis*, 121 U. S. 295, the court says:

" If, in the present case, owing to the necessary form,
" size, structure, and situation of a fireplace heater as
" ordinarily made and used, there were ascertained diffi-
" culties in uniting such a fuel magazine as Thatcher
" adopted from its known use in out-standing base-burn-
" ing stoves, and those difficulties were overcome by some-
" thing more than mere *mechanical ingenuity*, he might
" have been entitled to a patent, *not for the combina-*
" *tion, however made*, of the fuel magazine and the fire-
" place heater, but *for the means which he had invented*
" for effecting it. Nothing of that, however, appears in
" this case. The invention described is not of any such
" device for effecting the combination; no claim is made
" of that character. *The claim is made for the combina-*
" *tion, no matter how or by what means it is or may be*
" *effected*.

" In this view of the case, it is impossible to distin-
" guish it, so far as the rule of decision is concerned, from
" the cases of *Hailes* v. *Van Wormer*, 20 Wall. 353; *Heald*
" v. *Rice*, 104 U. S. 737, 754; *Pennsylvania Railroad* v.
" *Locomotive Truck Co.*, 110 U. S. 490; *Morris* v. *Mc-*
" *Millin*, 112 U. S. 244; *Hollister* v. *Benedict Manufact-*
" *uring Co.*, 113 U. S. 59; *Thompson* v. *Boisselier*, 114
" U. S. 1; *Beecher Manufacturing Co.* v. *Atwater Manu-*
" *facturing Co.*, 114 U. S. 523; *Gardner* v. *Herz*, 118
" U. S. 180."

All that is of advantage in the Kenaga rake is attributable to an arrangement of the lines described, but not claimed; but if the poles, acting in this sweep form of rake as they do in other forms, make the sweep rake work better, that fact, if a fact, would not change the supposed improvement from the domain of skill to that of invention, as appears by the following from *Smith* v. *Nichols*, 21 Wall. p. 119:

"But a mere carrying forward or new or more extended application of the original thought, a change only in form, proportions, or degree, the substitution of equivalents, doing substantially the same thing in the same way by substantially the same means with better results, is not such invention as will sustain a patent.

"These rules apply alike, whether what preceded was *covered by a patent* or rested only in public knowledge and use. In neither case can there be an invasion of such domain and an appropriation of anything found there. In one case everything belongs to the prior patentee; in the other, to the public at large."

In *Gardner* v. *Herz*, 118 U. S. page 190, the court restates the same rule, and answers the argument of "popularity and success" by finding it attributable to a cause not covered by the patent. In this case limited popularity and success is due to the arrangement of the lines whereby one man can manage the team and dispense with one man or boy rider.

"It may be that the Gardner seat is *mechanically a better seat than any which preceded it*, but his improvement is not a patentable one.

"It is strenuously insisted, that the popularity and success achieved by the Gardner seat beyond those of his predecessors, affords cogent evidence both of the

"utility and patentable novelty of his invention. The "answer to this argument is, that the success of his seat "is probably due to a feature which is not suggested in "the original patent, that is, its adaptability for use by "unskilled workmen."

The proofs in this line are defective in the fact that all comparisons are made with Kirk's cast-iron runner rake, one of the poorest of all known sweep-rakes, and the witnesses agree that the use of wheels in the place of runners was an improvement of value, as was also the addition of the seat shown in the Kenaga patent, but not claimed.

II.

PRIOR ART.

The Pennock patent of 1827, page 218, shows a two-wheeled sweep-rake, to which the horses are attached separately at or near the ends, or so spread apart that there is a wide space between them. The poles shown are rather draft poles than backing poles.

The King patent of 1866, page 231, the Middlecoff patent of 1869, page 235, and the Bean patent of 1873, page 248, each show that they are to be used by hitching a horse at each end, and separating them so as to leave a raking space between them. They do not show the bars BB of the Kenaga patent, which throw the hitch outside of and behind the wheels, but as these bars are admitted to be old in the form and position shown by Kenaga, it is not necessary to show them.

The Lyman and Baldwin patent of 1848, page 220, the Fowler patent of 1863, page 254, the Swinerton patent of 1867, page 252, the Nichols patent of 1868, page 256, and the Wicks patent of 1868, page 263, each show guiding and backing poles attached to horse rakes in var-

ious forms and manners, but in each of these, except the Lyman and Baldwin, the team is arranged in front of the rake, while in the Lyman and Baldwin it is behind the rake.

In the English patent to Perkins of 1868, page 272–4, the team is arranged at the sides of the rake, with the rake teeth between the horses, as in Kenaga, and they are hitched to the rake by two complete pairs of thills, one on each side, and in view of the statement of the Kenaga patent, that thills are the equivalent of the poles shown, it is insisted that this Perkins patent is a complete anticipation of the Kenaga patent. Kenaga's statement is, that "if preferred, a pair of thills may be connected with each "of the arms BB, in which the horse is hitched in the "usual way, which construction would be the equivalent "of that shown in the drawing."

It will be seen from the Appellee's Exhibit Drawing of the Perkins Patent, page 274, that it has the combination of the extended draft poles in the thills, that are called for by the appellant's claim. The only acknowledged defect of this drawing is that the rake is narrower than it should have been, as the specification states that the wheels are under the elevator, while in the drawing the elevator is between them. This variation is, however, in favor of the appellant instead of against it, and is therefore immaterial, and it is further immaterial as it in no way affects that part of the device which anticipates complainant's patent. Appellant's expert finds some fault with the manner of attaching the thills to the projecting draft-bar, but he admits that the draft-bar itself is proper, and is immaterial whether these thills are rigidly attached to this bar, or are hinged thereto; but it is claimed that they are to be hinged, for the reason that the device is sup-

ported on wheels at three points. Some objections have also been made as to the manner of applying the teeth, and the experts differ, but this is also immaterial as wheels and structure of teeth form no part of appellant's combination.

The guiding of this rake is not by any connection with the castor-wheel as supposed by appellant. The castor-wheel simply makes guiding from the sides by the separated horses practicable and easier as it takes the grouud friction from the teeth.

In order to show the general structure of such a machine as that described in the Perkins patent, the patent to Townsend of 1850, page 266, has been introduced. This Townsend machine only shows the general structure of such a machine as the Perkins patent describes. It differs from the Perkins in two important points: first, the experts both admit that hay might be gathered and carried by one of Perkins' suggested modifications; second, it has a framework and tongue in front while Perkins hitches his horses separately *at the sides*, with a pair of thills for each horse so arranged that the machine may be backed and the horses guided, as in the complainant's rake. This Perkins rake, in gathering hay, will do all that the Kenaga rake does in the same way, by the same means; that is, it can be loaded to the capacity of the rake and run to a rick or stack and delivered thereto, and be backed off. It cannot be argued as a matter of difference that the Perkins is a continuous rake, because the rake part could be used, if it should be preferred, with an ordinary back, and it would cease gathering when loaded, and would require to be drawn out into the field to gather hay, the same as the Kenaga, and when its load is delivered it has the same capacity for being backed out

from under the load that the Kenaga has and by the same means.

Several patents have been introduced in evidence in order to show that separated half-tongues, one for each end or side, are old; that separate pairs of thills, one for each horse, are old; and also to show that it was old to hitch at the sides of a machine.

The Roney Patent of 1856, page 223, shows a mower having its cutting apparatus in front and the horses separately hitched at the sides.

The Mason Patent of 1865, page 230, shows separate thills for a double team as applied to carriages.

The Patton Patent of 1870, page 238, shows separate thills, one pair for each horse, with a space between them for the corn row, as applied to a corn harvester.

The Currier Patent of 1860, page 228, shows half-tongues applied to a corn harvester, and the complainant's practical expert, page 62, A. 108, admits that these tongues *can be applied without change to the Kenaga rake*. They are applied by Currier for the same purpose for which they are applied by Kenaga; that is, to spread the team so as to leave a working space between them; to afford backing facilities, guide the team, and to enable one driver to drive both horses.

The Whitney Patent of 1871, page 244, shows the application of half-tongues similar to those of Currier, and for the same purpose.

The Carrothers Patent of 1872, page 246, shows the application of separate pairs of thills attached to projecting bars in a corn harvester, with the cutting devices between them. The thills are spread widely apart, and there is no indication in respect to any of these machines that more than one person is required to manage the team.

Currier, in 1860, made no claim for the projecting bars or the half-tongues, but treats them as old and well-known devices. All that he says about them is: "The "animals drawing the machine are placed one the outside "of each of the shafts G, and draw on staples in the "braces a^1. They walk one on each side of a row of "plants." The bars to which the staples a^1 for connecting whiffletrees are attached are bars in front of the wheels, but they are behind the team, as in the old rake to which Kenaga applied his projecting poles or thills.

It is insisted that the old Currier patent contains the combination of appellant's patent, with the sole difference that one is applied to a horse rake, while the other is applied to a corn harvester or cotton cutter. Such a change is merely mechanical, and is not patentable invention under the authorities.

Aron v. *Manhattan Co.*, 132 U. S. 84.
Royer v. *Roth*, 132 U. S. 201.

There can be no question but that the bars to which the thills are attached in the Carrothers machine are projecting bars, as they have no supports at their outer ends; and when we consider that in appellant's patent thills are made the equivalents of the projecting poles, it is insisted that this patent contains the identical combination of the appellant's patent; and if we change the words "horse rake" and "rake," in appellant's claim to "machine," the claim will then apply to the machines shown in the Currier and Carrothers patents, equally as well as it does to the Kenaga patent.

As considerable testimony has been taken in reference to the Kenaga rake, and its capacity to be used in connection with a ricker or stacker, the patents to Rundell of 1866, page 260, and Bean of 1873, page 248, have

been introduced to show that all of this testimony does not relate to stackers generally, but to one particular form of stacker. For use in connection with stackers shown in the Bean patent, projecting poles would be a disadvantage rather than an advantage, while for use with a stacker like the Rundell or the old Wicks derrick and fork, tongues at the sides or in front, or anywhere else, would not be in the way.

Townsend, in 1850, page 267, made the following claim: "The simultaneous raking and loading of hay "from the ground by machinery, substantially as herein set "forth, whereby the labor of making windrows and cock-"ing, as is the usual process of haymaking, is saved, at "the same time that the operation is both expedited and "cheapened."

Considerable testimony has been taken in regard to the utility of the poles of appellant's patent in keeping the horses away from the rake teeth, but devices which will accomplish this purpose are shown in the Rumrill patent of 1864, and the Hudson patent of 1869, page 237.

The Rumrill patent, page 251, shows elevated bow-fenders at the sides, and the testimony upon the part of the appellees is that breast straps can be attached to these devices with horses hitched at the ends and sides, as shown in said patent; so that this feature is shown to be old in sweep-rakes, or those wide rakes, in which the horses are placed at each side of the rake.

The Hudson patent, as appellees contend, shows the Kenaga poles in substance and in form. It will be seen that the appellant's Kenaga rake is constructed substantially upon the same plan of rake as that shown in this patent.

The Hudson patent shows a sweep-rake with the same

long teeth, the horses hitched at the sides, the outer teeth projecting behind or back of the axle, the projecting poles attached at one point directly above the axle, and at the other point to the rearward extension, so that the fulcrum of the pole, acting as a lever, is immediately above and on the axle, and the shorter arm of the lever is connected behind the axle the same in both machines. Appellant has attempted to reproduce the Hudson machine, and has produced such a machine, or the ends of it, in evidence, which machine is supposed to be in accordance with the machine originally built by Hudson himself; but as the appellants rely upon the Hudson patent, and do not rely upon any prior use or knowledge by Hudson, it is difficult to see how such reproduced machine has any standing in the case, as evidently the machine is not built in accordance with the patent upon which appellees rely. If it has any place, it is simply another machine in the art, but appellees insist that the setting up of another and different machine by appellant, and the attempt to belittle that machine, does not in any way affect the Hudson patent, or the machine therein described, as that is a materially different machine.

Hudson undoubtedly shows a much better rake than the one made by him, with his poor facilities, if it has been properly reproduced, and one of very different proportions. It is admitted by the experts that the wheels shown are probably somewhat too large, and give the rake a little too much pitch for a perfect rake. The patent certainly does not show that the machine is to be provided with 14-inch wheels, and the appellant itself, when it places wheels in the same position, uses 24-inch wheels. (*p. 83, A. 46.*) The patent shows the strip or head at the back of the rake to be no higher than the wheels, and Hudson says in his

patent that this back board "prevents the hay from slipping back over the prongs." In the appellant's full-sized reproduction the back or head of the rake is so high that it cannot serve this purpose. The standards are shown in the patent as slotted down to the wheels, while the machine exhibit is not so. The exhibit is altogether too high at the back, and is altogether out of proportion in all of its upper parts. It is admitted by appellant's expert, page 68, A. 141, that the blocks shown in the appellant's model of the Kenaga machine, to which the projecting poles are attached, might as well be in frame form as in the solid form shown in the model of the Kenaga machine.

The Kenaga patent does not show these blocks, and the model is therefore a departure from the patent and a nearer approach to the Hudson rake than the patent is.

The principal difference between the model and the Hudson patent is that the blocks to which the poles are attached are not quite so high as the Hudson frame; but this is a question of degree to be determined by circumstances, and greater or less height is not material.

It will be contended that the Hudson projecting poles are not long enough to serve the purpose of the Kenaga poles, and this may be true as the Hudson machine is organized; but if the Hudson poles are applied to the old rake to which Kenaga applied his poles, or if the hitch is carried behind the wheels; then they are long enough, as they are in fact longer than Kenaga's.

Considerable testimony has been taken to show that the position directly over the outside tooth is not as good as the Kenaga. The Kenaga poles as shown in the lithograph exhibits are straight poles and are without the irons *c*, of the Kenaga patent. The application of these irons to the Hudson rake would bring the horse in the desired

position without changing the line of the poles themselves, and the Hudson lines of the poles are exactly the same as the appellant's outside braces, so that by adding the old curved irons to the Hudson bars the attachment of the horses would be the same in both the Hudson and Dain rakes.

The record, pages 80, 81, 82, A. 39, 127 and 104, A. 41, shows that the horses learn in from one to two hours to keep away from the poles; so that the Hudson poles serve the same purpose in guiding and keeping the horses off from the rake that the devices of the appellant's patent do, and certainly it would not amount to invention to place side-hooks on their ends which could be used for connecting them with the breast-straps of the horses.

It is not invention for Kenaga to put the Hudson projecting poles to a further use than that contemplated by or known to Hudson. (See *Stow* v. *Chicago*, 104 U. S. 547.)

The Hudson rake unquestionably belongs to the same class as the Kenaga, and as all that Kenaga understood that he did was to add poles to a rake of this class, it is contended that the Hudson patent is a full and complete answer to Kenaga's claim, and that the most that can be claimed for Kenaga is that he put the irons *c*, on the Hudson poles, and this difference is not pointed out in the Kenaga patent, except as a mere adjunct; and these irons which constitute the difference between Hudson and Kenaga are not used by appellant on its rakes, thereby showing that it is an immaterial and unimportant difference.

We have already seen that under the authorities it could not amount to invention to apply common draft-poles to any traveling device or machine, and this exam-

ination shows that Kenaga did not in fact make such invention, and the combination claimed by him is substantially shown in the Perkins, the Currier, the Carrothers and the Hudson patents; and other patents illustrating the prior art, show that the most that can possibly be claimed for Kenaga, in view of these four patents, is that Kenaga was the first to apply an old and well-known form of pole to a special but old and well-known form of rake. That this manner of showing that there was no invention on the part of Kenaga is legitimate and proper, we call attention to the following:

In the case of *Gardner* v. *Herz*, 118 U. S. p 193, the court approvingly cites the following: "There was a "recent instructive case in England, in the Court of "Appeal, before Lord Coleridge and Justices Field and "Bowen, *Saxby* v. *Gloucester Waggon Co.*, 7 Q. B. D. "305, where the question was, whether 'the invention "specified was such a substantial improvement on what "had already been known and published as to render it the "proper subject of a patent.' *The specific patented combi-* "*nation did not before exist*, but it existed with the excep- "tion of two pieces of mechanism, and *their use for the* "*purpose of doing what they did in the combination was well* "*known*. But it was held that the combination might "have been made 'by any intelligent mechanical workman,' "with no other instructions than those contained in a prior "patent to the same inventor; and that there was no nov- "elty in the combination sufficient to constitute a patent. "In regard to another branch of the case, it appeared, "that, *taking two prior separate inventions together*, every "element of the patent in question was to be found in one "or the other of those inventions, and it was held *that the* "*combination of the two prior inventions did not require 'an*

" *exercise of such an amount of skill and ingenuity as to* " *entitle it to the protection of an exclusive grant.*' This case " is referred to for the purpose of showing that the ques- " tion of patentability, as depending on the *quantum* of " inventive skill in a given case, is one which the courts of " England consider in a suit for infringement. See, also, " *Penn. Railroad Co.* v. *Locomotive Truck Co.*, 110 U. S. " 490, and the cases there collected."

See also, *Florsheim* v. *Schilling*, 137 U. S. 64.

This case is, of course, to be understood as applying to such a putting of parts together as could be put together without reconstructing the parts, and to such as do not co-act so as to produce a new result or operation by their co-action. Kenaga simply put Currier's half poles onto an old sweep-rake, without any change, adaptation, or reconstruction. Currier attached his poles with two bolts, and Kenaga uses the same two bolts; the only difference between them is that Currier's bolts are horizontal, while Kenaga's are vertical. There certainly is no invention in the manner of applying the poles.

This case seems to come squarely within the rule laid down in *Aron* v. *Manhattan Co.*, 132 U. S. 84.

CONSTRUCTION.

The patent states that " the invention consists in pro- " viding means at each end of the rake whereby the horses " there attached *may back the rake* out from under its load, " instead of turning around and drawing it out."

This rake requires just as much turning of the horses as the ordinary sweep rake does which is not provided with poles, and more turning of the rake, (page 199, A 10), for it is self-evident that when coming from the field to the stacker, the team and rake must be turned around to go

back, and that when back again the team and rake must be turned to fill it for each load, and that so far as the mere matter of turning is concerned, the pole rake, if as easily, is not any more easily managed than the other; in fact, the principal advantage claimed in this respect is that a better approach can be made to a stacker so as to produce a less liability of breaking the rake teeth or the stacker prongs. It will readily be seen, however, that this objection or advantage only relates *to such stackers as have teeth* or prongs laying on the ground, and does not apply to a platform stacker, nor to harpoon or fork stackers.

The patent states that another advantage in the use of the rake is " to do away with the use of riders and to enable a single man or boy to manage both horses." This point relates to the lines and will be considered further on in connection with the testimony.

The means provided by Kenaga at each end of the rakes are the projecting poles, C C (or their equivalent thills), which are stated to be " stiff poles secured permanently or removably to the ends of the rake-head," and that they are to be " directed forward, upward and out- " ward therefrom, so that the free front end of each is in " position to allow the adjacent horse to be hitched thereto " by a breast-strap." A *rigid attachment is necessary* in order to produce and maintain the forward, upward and outward position, and the " removably" attached implies the use of the rake without either poles or thills. The bringing of the poles around so as to make a direct application of the breast-strap is accomplished by the iron hooks, *c*. If thills are applied the peculiar features of the draft poles as to their extending forward, upward and outward, must be omitted. These features cannot, therefore, be used to differentiate appellant's rake from the Hudson

or other rake, nor as a supposed feature of resemblance in appellees' rake.

Considerable testimony has been taken in respect to these positions, in order to differentiate the Kenaga rake from the Hudson rake; but, as stated, the acknowledged full equivalency of thills wipes this all out of the case. It will be apparent to anyone handling teams that if thills are the full equivalents of poles, any *particular feature or arrangement* of poles, except rigidity, is of no account. If thills are rigidly attached to the draw bars they will of course project upward and forward, but not outwards, as they cannot be attached to the ends of the rake head as the poles are, but must be attached to draw bars extending outwards therefrom, as in the Carrothers patent. It is therefore evident that all testimony based upon the particular location and direction of the thills, and the testimony taken in respect to the same, can serve no useful purpose in determining the issues of this suit, as under the patent they may be all thrown away and still have their full equivalents in the thills, which, with the exception of being rigid or stiff, cannot have the peculiarities which are within the specific terms of the specification itself.

If the court should conclude that the patent is void for either reason, to wit: want of patentable invention, or want of novelty when considered in relation to the prior art, it is immaterial what the true construction of the patent is; but if the court should be of the opinion that it is a valid patent, then its true construction must be determined before considering the question of infringement, which must also in this event be considered.

Prima facie all that the patent is for is the application of *backing* poles to an old and well-known rake.

This is admitted in the statement of invention, and also in the specification, which says: "The horses being hitched to the projecting arms BB for draft, and forward to the poles CC for backing," etc. It clearly appears that the projecting poles are applied for backing, which, with guiding, is their only known use. There is no mention in the specification of their being useful for guiding, except when they are used with *and in addition* to the thills, in which case it is a bridle-strap, and not the breast-strap, that is hitched to them. The larger part of appellant's testimony may, therefore, be eliminated from the case as having nothing to do with the patent. Upon the *prima facie* construction, it appears that this improvement is not to be understood as relating to the application of poles or rakes generally, but only to a *sweep-rake class*, which is to be used in connection with stackers, and not even to this class generally, but "particularly to those rakes of "this class which are drawn by horses hitched one at each "end."

When we consider the patent in its relation to the prior art, we find that these half-tongues, or projecting poles, with a working space between them, are old, and had long been in use in connection with various agricultural implements; and we find that thills connected to projecting bars, or the projecting ends of a single bar, were old in connection with horse rakes which are "drawn by horses hitched one at each end."

The Perkins Patent shows this arrangement, and the only attempt to escape it on the part of complainant is to avoid its relevancy by insisting that the Kenaga Patent calls for the addition of these poles even when thills are used. It is insisted that there is no such statement in the patent. The statement of the patent "that it will be

advisable to employ the poles B," does not make them essential, as has been repeatedly held by this court.

See,

Paper Collar Co. v. *Van Dusen*, 23 Wall. 560.
Brown v. *Piper*, 91 U. S. 39.
Sewall v. *Jones*, 91 U. S. 185.
Russell v. *Dodge*, 93 U. S. 462.
Matthews v. *Machine Co.*, 105 U. S. 59.
Loom Co. v. *Higgins*, 105 U. S. 599.

As compared with the Hudson rake, the utmost that can be claimed for Kenaga is that he put the unused irons *c* on the ends of the poles, so as to afford a breast-strap hitch for backing purposes. It is true that Hudson's rake does not show projecting draft bars, BB, behind the wheels; but as these are admitted to be old, this difference cannot be considered in Kenaga's favor, as Hudson, or the public, have the same right to put them in this position that Kenaga has, because, as appears from the record, Kenaga found them just where they are placed, and it appears from the evidence that when the hitch is carried back in this manner the Hudson poles are long enough to be used in identically the same way that the Kenaga poles are used.

The appellant and the appellees alike dispense with the front irons *c*, so that even this difference between the Kenaga and the Hudson rakes is an immaterial and unimportant one.

Considerable testimony has been taken in an attempt to show that the Hudson poles are not strong enough to be used as guides for the rakes, but the patents show that the Hudson poles are the larger and stronger of the two, while Hudson's method of attachment to the rake head is perhaps somewhat less strong; but the testimony fully shows

that the poles in the Kenaga rake are not relied upon and are not used for guiding the rake or the horses. (*See appellant's testimony, pp. 82 A. 37; 84 A. 55.*)

It also appears from the testimony that the rakes are guided and turned by the draft of the horses just the same, with or without the poles (*p. 211, A. 93*).

From the examination of the prior art, and the evidence relating to the manner of using these rakes, it clearly appears that Kenaga has added nothing to the art, nothing to the operation of the rake, and that his devices are all of them old and well-known in the art to which the patent relates, so that his claim cannot be sustained upon any change or novelty in the devices in the rake, or which are elements of the combination, or on the supposed peculiar qualities of the *stiff* poles as applied to horse rakes generally, and, if the patent is sustained at all, it can only be sustained upon the construction that the patent is for the combination of the Currier projecting draft poles, with a horse hay-rake of a *particular construction in a special class*. The evidence amply shows that nearly all wheel rakes, including sweep rakes, revolving rakes and wire-tooth rakes, are provided with either tongues or thills for guiding and backing purposes.

III.

INFRINGEMENT.

The appellees' rake differs in several important respects from that shown in appellant's patent, but several of these differences are in parts of the rake which do not affect the subject matter of the claim in controversy, and yet they have such a bearing in the operation of the rake as strongly tends to the conviction that appellees' application of poles to a horse rake is substantially different from that of the appellant.

In appellees' rake the wheels are not at the ends of the rake, but are set in near together and revolve upon the rear bar of the rake-head. The appellees' seat is located upon a long bar, so that the driver can, at will, give more or less pressure on the teeth against the ground, and by sliding the seat to the extreme rear of its supporting bar elevate the front ends of the teeth, so that they will clear the ground and form a three-wheeled cart for the transportation of the rake and its load from that portion of the field where its load was gathered to the stacker, or to a barn and back again, and for the purpose of producing such results *hinged poles* are necessary.

One special feature of the Kenaga poles is that they are " stiff poles, secured permanently or removably — that is, by spikes or bolts — to the ends of the rake-head." Appellees' poles are not stiff poles, and they are neither permanently secured nor removably attached to the ends of the *rake-head*. The inner ends of the poles are carried in nearly to the front of the wheels in their new position, and are attached there by eye-bolts, and are braced out near the front ends of the teeth by brace-bars hinged to the draft-bars located *over and nearly in line* with the outer rake teeth, like the Hudson poles; and if the braces, as contended by the appellant, are in fact the acting part of the poles through which the backing power is applied indirectly, and only so much of the true poles as projects beyond them is material, then they are in fact the Hudson poles with the front ends turned outwards. It will be seen that the Hudson poles are hinged at their rear ends, and that they have sliding guideways at the front of the rake-head, which sliding guideways are in appellees' rake, and are made of metal, instead of wood, as in the Hudson.

The appellant's theory of finding an infringement in

the appellees' rake reduces the Kenaga invention to the hooks *c*, which are simple extensions outward of the front ends of the poles, which most certainly could have been applied to the Hudson poles without invention.

The side poles or braces of the appellees' machine have a limited free movement in the guide at the front bar of the rake-head, the same as the Hudson would have if two limit pins were used (one above and one below), instead of the single pin used by him.

The true poles of the appellees' machine, however, are the ones with which the horses are connected at their front ends, and which extend inward, as shown in the model, and in appellees' Dain patent at the fourth tooth of the rake. If the rear ends of the poles were carried in in this manner in the Kenaga machine it would be inoperative, for the reason that by the low connection of the Kenaga poles to the head the hay would wedge in under them so that it could not be discharged, while by the high location at the head, and the hinged connection of the appellees' machine, no such injurious result follows, as however much pressure the poles may have upon the hay, when the teeth are dropped for discharging, the hay is relieved of its pressure and is freely discharged.

It is true that the appellees use projecting bars similar to those of the Kenaga machine, but, as we have before seen, these bars are public property, and appellees have the same right to use them that appellant has, and also that they are no part of Kenaga's invention and therefore cannot be used for distinguishing the Kenaga invention from the prior art.

In the Kenaga rake the entire weight of the front ends of the poles is carried upon and by the front ends of the rake teeth and add to this extent to the pressure of the

rake teeth upon the ground, while in appellees' machine their weight is carried by the team and adds nothing to the pressure of the rake teeth.

It will also be seen that by moving the driver's seat backwards and forwards the pressure of the teeth can be adjusted, or the front ends of the teeth can be thrown up to avoid obstacles, or held up to pass across old dead furrows, which is a great advantage and improvement. This movement is permitted by the hinges of the tongue and is performed without raising or lowering the point of the tongue, while a similar arrangement applied to the Kenaga rake would constantly vary the height of the tongue and the adjustment of their front ends, in relation to the teeth and to the team, while the team would impede this operation, and at least to some extent limit it.

The appellant's rake is a rigid one like a road scraper, and the appellees' is a flexible one, and the feature of flexibility is always an important thing in horse rakes, mowers, or other machines running over uneven ground.

Appellant's poles are the old Currier poles, while appellees' poles are of an organization not heretofore found in the art. The appellant's poles simply require transference from one machine to another (*See Appellant's Ev. p. 62, A 108*), while the appellees' poles, both in form and adaptation, required invention, even after the Kenaga patent became a part of the art, as is evident from an inspection, and also from the Dain patent, under which the appellees' rakes are made, and was so considered by the Patent Office, as clearly appears from the first and second claims of said Dain patent.

If Kenaga made an invention in applying *stiff* projecting poles to this class of rakes, then Dain certainly made an invention in applying *hinged* tongues to the same rake

in the manner and form in which he constructed and applied them, and both should stand independently as improvers of the same old machine, according to the finding in *McCormick* v. *Talcott*, 20 How. 402.

MINOR POINTS.

Much importance has been attached to the arranging of the lines and considerable testimony has been taken in regard to the manner of arranging them, in order to enable one driver to manage a team with the horses separated so far apart, and some witnesses have testified that when first brought to their attention they did not consider it possible to do it; but we call attention to the facts,—First: That there is nothing in the claim in any way relating to this hitching of the horses. Second: That *the method* of hitching detailed by the witnesses *is not the one described in the patent*, as appears from the testimony of appellant's witnesses, page 80 A. 20; 84 A. 56–7, 62; 96 A. 23; 98 A. 22–3. Third: That the method actually used is one which farmers fell into as an advisable expedient.

Appellant's witness Crone, page 81, A. 27, states that in Kentucky the parties used the Kenaga rake exactly as Hudson described his rake to be used; that is, notwithstanding the fact of the half-poles being applied, which was evidently the case, "they would hitch a mule to each draft-bar, and put a young nigger on each horse to ride."

Considerable testimony has also been taken to show that the application of the Kenaga poles was an important improvement, because of the saving effected by it. The defect of this testimony is, that all the comparisons are made with an old cast iron runner rake used by each witness only in the season of 1882, except Kirk, who p. 30, A 44, 45, compares it with his older *push-rake*. This

old runner rake was like that of the Hunter patent of 1867, page 268, with the exception that runners were made of cast iron, instead of wood. Hale, page 86, says the saving on good ground was about one-third or more; on page 88, that, in 1882, he harvested 100 acres in two weeks; that for the four years 1883–4–5 and 6, when he used the poles, the harvest for each year required about three weeks, with the same acreage in 1883–4; 120 acres in 1885, and 140 acres in 1886 Thus, in fact, harvesting *less with the pole rakes* on wheels than with the runner rakes without them; on page 88 he also says that a person could not drive the horses with the pole rake any faster than with the runner rake; while Mr. Dain, *page 199, A. 10*, says that you cannot drive the team as fast, because when dragging the rake backwards you can put the horses on a trot, which cannot be done when dragging with the teeth forward; and that in rainy weather this is frequently done and is a great advantage, and an advantage which cannot be availed of when the rake moves forward and the teeth are on the ground; so that in respect to the movement of the team the time consumed in passing from the stacker to the unraked field is greater with the Kenaga than the old sweep rake, or the appellees' rake, when the teeth are held above the ground; and the fact that Hale, with the old rake, handled 100 acres without the poles in two weeks, while it required three weeks with the poles to do the same work, is a demonstration of this fact.

Finnell, page 99, states that in handling the old runner rake you had to have *a man at the stack to pull the rake back* from under its load, and that the saving *of this man* was worth at least $3 a day; but as *this man* is not required or used with the ordinary sweep rake, as he was in the use of Kirk's old rake, which he sold in the season

of 1882, and with which all comparisons have been made, this saving cannot be attributed to the use of poles.

Patton, page 94, states that he changed his rakes from the old slide rake to the Kenaga rake, by reason of hearing of the advantage of "*wheel* rakes" over "*slide* rakes;" and, in answer to cross-interrogatory 41, he states that the *ad dition of the seat and wheels* were improvements upon the rake of 1882.

Carrington, page 103, states that the improvement, as compared with the 1882 rake, consisted in the addition of *wheels* and tongues, so that one man could manage the machine, and that the attachment for elevating the front ends of the teeth, shown in appellant's Acme rake of 1886, was of value.

The only saving mentioned in appellant's patent is to do away with two riders, so that a single boy or man can manage the machine; but it is evident that in all of the rakes and other machines exhibited by the appellees the team was managed by one man, as teams usually are under all circumstances, and, as we shall see hereafter, this saving is attributable to the arrangement *of the lines* rather than to the application of poles.

On this feature, Kirk, p. 30, A. 46, says that two boys cost the same as one man. If the two boys rode, the one man for driving was dispensed with so that under this statement there was not even the saving of the cost of one boy.

It is not contended, nor is it necessary to contend, that the horses can be brought around, so as to alternately draw the rake forwards and backwards by a single man or driver.

Neither does Kenaga do it, as his rake *is always drawn forward*, the same as any other machine or vehicle; and it

is not an invention, nor is it anything new for one man to drive two, four, or more horses.

It appears from the testimony that the saving in respect to moving the rake is against the application of poles, exept in one particular, that of catching the teeth while the rake is gathering its load, or when backing is required to free it for so short a distance as that required to liberate the rake from a tussock or hummock of grass. This can undoubtedly be accomplished quicker by backing than by turning the horses, and with this sole exception there can be no saving in time, while in getting back from the stacker to the field there is a greater disadvantage and loss of time; so that in the average there is no saving, so far as time is concerned.

The devices show, and the fact is, that the saving lies solely in the supposed dispensing of one boy or rider, and that this is due, not to the poles, but to the hitching of the horses and the arrangement of the lines.

Johnson, page 91, states that he bought the Kenaga rakes of Kirk for the same price that he paid for the slide rakes and sold them for the same price; while Patton (p. 93), also a dealer in agricultural implements, states that the pole rake was $5 more than the 1882 slide rake.

As a complete answer to the use of poles as guides to keep the horses off the rake, Crone, page 80, states that after the horses were driven an hour and a half they would learn their position, and, on page 82, that after an hour or two the horses would learn to keep away from the rake. Carrington, page 105, says, that horses learn their positions in less than half a day. The Hudson poles would guide and keep the horses off from the rake teeth, as they are in line with the rake teeth, and would hit the horses in ample time to keep them off the rake teeth.

Some testimony has been taken in regard to the hitching from the bit of the horses to the pole as a guide, but as according to the patent this method of guiding is only used when thills are applied, and only as an "advisable" procedure, it is not necessary to follow this point or the testimony relating to it.

All that has been said or can be said with regard to any saving by the use of projecting poles, can be said with equal truth in respect to any or all of the old rakes, harvesters, grain, corn, or cotton cutters, and other machines where two horses are used, spread apart and handled by a single driver, and this method of attempting to bolster up the Kenaga patent must of necessity be a failure.

QUOTATIONS FROM THE RECORD.

Invention.

BATES states the invention as follows:

Page 161, A. 4—"The invention is stated in the patent, to relate to horse hay-rakes of the class in which the horses are hitched, one at each side of the machine, to projecting draft-bars. To overcome certain objections, which he sets forth, the patentee adds, to the rakes of the class named, a couple of stiff poles, one at each side of the machine, which poles project outward toward the heads of the horses, so that the horses may be attached to them to back the machine when desired. It is the combination of these stiff poles with the draft-bars, which I understand to be the improvement specified in the claim of the patent. The patentee states in his specification, that instead of the poles, thills may be used, the thills being the equivalent

of the poles. As I understand the specification, there is nothing peculiar about these thills or poles, except their application to this particular machine; they are the ordinary devices, to which the horses are hitched forward, for backing the wagon or other machine to which they are hitched, and for guiding the animals."

Page 168: C. Int. 31—" Refer to the Defendant's Exhibits King Patent and Bean Patent, and say whether or not they are fair illustrations of the prior art, in the class of sweep rakes having side-draft attachment, as mentioned in lines 12 to 32, column 1, of the printed specification of the Kenaga patent?

A.—" So far as they go, they are. I should say, however, that the drawing of the Kenaga patent itself was the fairest illustration. Imagine the poles CC to be omitted, and the Kenaga drawing shows exactly the class of rakes known to the art at the date of Kenaga's invention. At least the specification so states in the lines referred to, and lines 37 to 40."

Page 191: Int. 213—" How, if at all, would it change the character, construction or use of the combination of parts, claimed in the complainant's patent, if the Kenaga rake was placed in front of and attached to an elevating apparatus?

A.—" Not at all. The combination would still be there, and would operate in exactly the same way, and accomplish the same purposes as before."

KIRK, page 74: R. D. Int. 184—" What do you mean by stating in your answer to C. Int. 178, that it would make but very little difference if the front end of the Hudson bars were brought outward by attaching said bars to the outside of the front standards shown in the Hudson rake?

A.—" The necessary distance to which the ends of the poles C should extend outward from the points of the outside end teeth of the rake, in order to keep the horses off of the said teeth, should be about three feet; an outward extension of six inches would be no perceivable advantage."

R. D. Int. 185—" When you speak of the poles extending outward, as in your last answer, from the points of the outside end teeth, do you mean in advance of the teeth, or at the side of the teeth?

A.—" I mean laterally outward, from the side of the teeth."

DAYTON, page 112: " What was old in the rake described in the Kenaga patent was the rake proper, and the projecting draft-bars to which the horses were hitched. What is new in the Kenaga patent, is the added elements of stiff poles, having their front ends arranged in position to be hitched by breast-straps to the horses so as to enable the rake to be backed from under its load, and also serving to aid in guiding the horses when driven by a single man or boy located centrally behind the rake, or the equivalents of these guiding and backing poles.

No Invention.

The following quotations relate mainly to matters of skill in adaptation and to selections of common and well-known devices applied to produce their old and well-known operations:

BATES, page 162: " The Currier patent shows and describes a corn-harvester, in which the horses are hitched, one at each side, to projecting draft-bars, and in which there are two stiff poles, one on each side of the machine, which poles project forward, upward and outward, so

that the free front end of each is in position to allow the adjacent horse to be hitched thereto. This is exactly the complainant's combination applied to a corn-harvester, instead of to a hay-harvester or rake. Any mechanic could, without invention, have taken this combination from the Currier patent, and applied it to one of the existing rakes at the date of the Kenaga invention."

Page 163: "The King patent of 1866 shows and describes a horse-rake, in which the horses are hitched one at each side of the machine. If the thills of the Mason patent, or the poles of the Currier patent, were applied to this machine, as they could be by any mechanic without invention, we would have the complainant's patent machine.

"The Wicks patent shows and describes a horse-rake having a pole to which the horses are hitched. This machine can be used to gather a rake full of hay to deliver to the stacker, and the machine can then be backed out from under its load, just as the complainant's machine is.

"The Middlecoff patent of 1869 shows and describes a horse-rake for gathering hay and delivering it to the stack. The horses are hitched one at each side of this machine, and it is only necessary to apply to it the thills of the Mason patent, or the poles or draft arrangement of the Currier patent, to convert it into the machine described and claimed in the complainant's patent. Any mechanic could make this application without invention, and it is the first thing he would think of, if he wanted to back his rake out from under its load, or to arrange it so that the horses could be managed by a single man or boy."

Page 164: "The Whitney patent of 1871, shows and describes a corn-harvester, in which the horses are hitched, one at each side of the machine, to suitable draft-bars.

At each side of the machine there is a pole extending forward and outward, to which the front end of the horse is hitched. This enables the horses to back the machine, and enables one man to manage both horses. Any mechanic could substitute haying mechanism for the corn harvesting mechanism, and thus produce the machine of complainant's patent without invention.

"The Carrothers patent of 1872 shows and describes a corn-harvester, having a pair of thills at each side of the machine, and a series of teeth in the space between them. These teeth could be arranged to gather hay and deliver it to the stacker, and the machine would then be exactly the machine of complainant's patent.

"The Bean Patent of 1873, shows and describes a horse rake of the class set forth in complainant's patent. Any mechanic could, without invention, apply to this Bean machine, the separate poles of the Currier or the Whitney patents, or the separate thills of the Mason, the Patton, or the Carrothers' patents, thus producing exactly the machine of the complainant's patent. He could do this without invention, because neither the poles or thills nor the rake have to be changed at all to adapt them to each other, and because the functions and operation of these parts, is exactly the same in their new position that they were before.

"The Rumrill Patent of 1874, shows and describes a similar machine to that of the Bean patent, and the same remarks apply to it as to the Bean."

Page 168: "Most of the prior rakes could be discharged by backing them, by simply adding to them the old and well-known thills and poles, in the old and well-known manner."

KIRK, page 30: Int. 43—"You may state whether

or not this demand for attachments to convert the old drag rakes into rakes of the Kenaga pattern still continues?

A.—" It does, and we furnish yearly a great number of them."

Page 62: C. Int. 108—" If you took the same rake that Kenaga took to use with his tongue, and applied thereto, the Currier poles, parallel to each other, in line with, and over the outer teeth, would you not still have the Kenaga rake; or would it, in your opinion, be another and different rake?

A.—" If I understand your question exactly, presuming that the rear part of the Currier tongues were bolted to the same blocks at the rear of the rake, as shown in the 'Complainant's Exhibit Acme Rake Model,' I think they would serve the same purpose for backing, though not as well as in the Kenaga device; neither could the rake with these poles be drawn on to a pitcher or ricker fork. I think that it would be substantially the Kenaga rake though not as practical as with the poles shown as Kenaga arranged them, for either backing or other purposes."

Page 70: C. Int. 154—" The drawings, however, clearly indicate how the tongues are attached to the rake-heads, do they not?

A.—" For the reason that rake-heads at the date of the Kenaga patent were arranged and constructed similar to those in Acme Model and Exhibit Defendants' Rake, I think they do."

HESSLING, page 96: C. Int. 27—" The leaving out of the check line after the trouble you had with it was your own idea, was it not?

A.—" Yes, sir; so far as I recollect."

DAYTON, page 139: C. Int. 50—" If you was drawing a specification for some improvement in a cart, and

which in no way related to the draft devices, would you not think it sufficient in this respect to say that the vehicle was to be drawn by horses harnessed in shafts or poles to be there provided, the method of attaching and using poles and shafts being so very old that it would be entirely safe to leave this matter of harnessing to the skill of the constructor?

A.—" I would, because in that case nothing unusual would be intended relative to the position of the horses or the mode of operation of the thills or poles."

Page 145: C. Int. 77—" Is not the handling of a team composed of two horses, by a single driver, the rule, and not the exception?

A.—" It is and was, except as to this class of long stacker rakes, where the rule was the other way without exception prior to Kenaga's invention."

Page 147: C. Int. 83—" You would take it, would you not, that the Carrothers machine was managed by a single driver?

A.—" I would."

C. Int. 86—" You would understand, would you not, that this Carrothers machine could be backed?

A.—" I would."

Page 148: C. Int. 92—" Would not a Kenaga rake, four or six feet wide, be an operative machine for gathering hay from a windrow?

A.—" Yes."

Page 151: A. 111—" In the sense that all poles are the same in being long sticks or bars, Defendants' Patent Exhibits show the poles that *Kenaga selected for his rake;* but they do not show, in a single instance, such poles applied to anything in the same way or wherein they

accomplish all of the same results, or wherein they are employed in the same combination."

Page 152: C. Int. 116—"Then, is not what you have thought to be a new mode of operation in the Kenaga rake, simply a different way of handling it to produce the old operations?

A.—"By the new mode of operation to which I have several times referred, I have not meant a new mode of *doing its work*, but a new mode of *managing the rake*, including the *management of the horses* by a single driver, in the direction in which the horses work in withdrawing the rake from beneath the load, and in drawing it empty across the field."

Hudson Patent.

BATES, page 186: C. Int. 183—"Would it not be necessary to modify the arms C, of the Hudson machine, by providing them with means whereby the chains could be connected thereto?

A.—"It would be convenient to have a staple or loop or hook at the end of the arms. That could easily be put on."

DAIN, page 200: Int. 12—"Please look at Defendant's Exhibit Hudson Patent, and state whether or not the poles there shown, under the proportion stated in the specification, would be of sufficient length to connect the horses with them by ring and strap, as mentioned in your last answer?

A.—"The specifications states that the teeth are about eight feet long, and the drawings show that these poles, marked C, are full as long as the teeth, while the attachment for the horse's single-tree is on the outer end of the axle, at the rear end of the teeth; it would allow a horse

being hitched by his breast-strap ring and extra strap, as spoken of in the last answer, as the ordinary thills in a buggy or wagon are only about six feet long from the single-tree to their forward ends."

Page 202: C. Int. 27—" If, therefore, as one skilled in the art you were to build a machine in accordance with the Hudson patent, and to accomplish the purposes of this patent you would extend the bar C about as far forward as the front of the horse's shoulder, would you not?

A.—"I would extend it at least this far forward, but as the specifications speak of the teeth being about eight feet long, the drawings would show the bars C to be even longer than to pass the horse's shoulder."

Page 203: "Assuming the dimensions, as stated in the specifications and drawings, it would be possible to hitch the average horse to the bars C by their breast-straps, especially if the irons shown, marked *c*, on the ends of the poles C, of the Kenaga patent, which are not claimed therein, nor are they used on their machines, were used on the ends of these bars C, of the Hudson patent."

Page 204: C. Int. 41—" Would it not be necessary to extend these bars in some manner, either forwardly or laterally?

A.—" The horses could be practicably hitched to this rake, in the manner spoken of in the preceding question, without the use of any other device or extensions."

C. Int. 42—" What do you mean by the expression 'practicably hitched,' in your last answer?

A.—" I mean that the horses could be hitched to the rake by any one who knew how to hitch up a horse, so that the rake would operate."

C. Int. 43—" Operate for what purpose, and in what manner?

A.—" For the purpose of raking hay from the field to a stack or ricker."

Page 207: A. 64—" It would make no difference, in my judgment, how high or low the rear ends of these bars C might be connected to the head of the rake, so long as their forward ends were free for the attachment of the horse's breast-strap at a convenient height."

Page 208: C. Int. 75—" What do you undestand to be the object, in the constructions defined in the Kenaga patent, of attaching the poles at the end of the rake-head?

A.—"In order that the horses may be hitched by the side and close to them, similar to that shown in the Hudson patent."

C. Int. 76—" Do you mean to infer by this last answer, that the purposes of the poles in the two patents are the same?

A.—" By attaching the horse's breast-strap to the end of the poles, in both the Kenaga and Hudson patents, their purposes would be the same."

KIRK, page 68: A. 141—" They would be more expensive to make in four pieces in a frame, neither do I think the frame could be made so strong as the solid piece of wood set edgeways with bolts passing through them drawing the grains of the wood together, giving them additional strength, but I don't know it would make any difference in other respects so long as the necessary purpose for which it is intended is accomplished."

Page 71: C. Int. 161—" If the location of the Hudson cross bar above the rake-head is a proper one to prevent 'the hay from slipping back over the prongs' in a Hudson machine, it would be a proper one in a Kenaga, would it not; I mean as located by you in the Exhibit Hudson machine?

A.—" The cross bar would, of course, serve the same purpose in that regard on one rake as well as the other."

Page 75: R. D. Int. 189—"Assuming the wheel as shown in the Hudson drawing to be made on a scale as of fifteen inches diameter, which I understand to be the diameter of the wheel actually used by Hudson, about how high on such scale as a basis, above the end teeth, would the front and rear standards extend, which are attached to such teeth and serve as supports for the hand bars C?

A.—" The front standard would be fourteen inches, and the rear standard ten inches, as near as I can calculate.

DAYTON, page 138: C. Int. 45—"A rake having the supposed construction of locating the poles over and in line with the outer teeth and the ends carried outwards by means of iron hooks, could be backed, could it not, and managed by a single driver, having the reins arranged as stated in the Kenaga specification?

A.—" It could be backed, undoubtedly; that is, the backing force could be made to act through the poles thus constructed. But whether the horses would be kept off the rake in backing, or would be properly guided in other movements of the rake, I am unable to say."

Page 149: C. Int. 98—" If you applied draft bars, like the draft bars B of the Kenaga machine, to the Hudson rake, Hudson's poles would then be long enough for tongues or poles, would they not, to be used for backing purposes?

A.—" Draft-bars could be set far enough behind the wheels of the Hudson rake to bring the horses' breasts back of the ends of the lifting poles or bars of the Hudson

rake, and this condition of such supposed use would thereby be produced."

Page 150: C. Int. 107—" Do you understand that the Hudson drawing is made any more specific in regard to proportions than the Kenaga is?

A.—" I don't suppose it is."

Perkins Patent.

BATES, page 190: Int. 209—" Would a mechanic skilled in the art, have any difficulty in constructing the apparatus described in said Perkins patent for gathering cut crops, from the Perkins specification?

A.—" No, sir; none whatever. The description is very clear."

Page 197: C. Int. 255—" In this class of machines, at the date of the Perkins patent, was it not common to hitch the horses to the machine without providing any means whereby the machine could be backed?

A.—" Yes, sir; and so, also, it was common to provide such means."

Field Operations.

BATES, page 165: f. 309—" With the old-style rakes, when the load is brought to the stacker, the horses can be swung around, drawing the rake away from the load, and taking it back to the field on a trot; whilst, with the complainant's patent rake, the rake must first be backed away from the load; the load must sometimes be held while the rake is backing away from it; the rake must then be turned around, and, owing to the impossibility of raising the teeth any distance from the ground, must proceed slowly back to the field."

Concerning the Hudson rake, page 163, f. 306, he

says: " At each side of the rake there is also a pole, which extends forward near the horses' heads. The horses could be hitched to the forward ends of these poles, and then could back the machine, and one man could manage both horses. With the horses hitched to the front ends of these poles, the Hudson machine would contain the combination of the complainant's patent. Any ordinary farmer's boy would hitch the horses in this way without invention."

Page 170: C. Int. 44—" Please describe the operation of a rake, made in accordance with defendant's model, when backing from beneath its load?

A.—" There is no particular operation about it. The horses pull back upon the ends of the poles, and the rake moves backward."

C. Int. 45—" Am I to understand, therefore, that in backing a rake, made in accordance with the defendants' model, and a rake made in accordance with the Kenaga patent, the operation of the poles is the same?

A.—" The poles force the rake backward in both cases, just as any wagon pole does, and just as the poles in the Hudson, Whitney and Currier patents, force their machines back."

C. Int. 46—" Is the operation of the poles, in the two forms of rakes referred to in the preceding question, the same in wheeling or turning the rake?

A.—" The poles have nothing to do with turning the rake. The rake is turned by making one horse move faster than the other."

C. Int. 47—" Am I to understand, therefore, that so far as the operation of turning the rake is concerned, the poles have no useful functions whatever?

A.—" None whatever, except as fenders to keep the

horses off the teeth in the defendant's machine, and possibly off the wheels in the Kenaga."

C. Int. 48—"Please explain where there is a difference, in the mode of operation of the poles, of a rake, made in accordance with defendants' model, and a rake made in accordance with the Kenaga patent?

A.—"In backing the Kenaga rake, the tendency will be to raise the teeth, whilst in the defendant's rake there is no such tendency. In the Kenaga rake, the poles prevent raising the teeth off the ground to any extent, when the rake is moving forward, owing to the weight of the poles, and the fact that they would strike the horses under their chins, whilst in defendants' rake, there is no such resistance, and the teeth may be raised to a considerable extent."

BATES: page 181, C. Int. 135—"For purposes of practical field operation, would it not be necessary to employ separate riders for the horses, in order to turn them about in the manner defined in the patent, even if thills were employed?

A.—"No, sir. The horses could be turned in both manners, by one man at the center of the rake."

C. Int. 136—"Would this be a practical way of operating the King rake, with the suggested modification?

A.—"I think it would."

DAIN, referring to rakes with and without poles, says:

Pages 199, 200: A.—"The rakes being of the same size, I don't think there would be much difference in the capacity, if any, as the horses can be turned around and pull the rake from under its load, and go back into the field after another load, without any other stops, and without any danger of the teeth running into the ground, or obstructions as they are pulled backward, no matter how

fast the horses might travel, as the rake is pulled backward; while with the Kenaga, or rakes of that class, the horses must first back the rake from under its load, then turn the horses around with the rake, before starting back after another load, and this same turning operation must again be repeated, when it is desired to re-load the rakes. The difference in the rake shown in the model and the Kenaga rake, or the other rakes mentioned, when the horses are backed from under the loads, then, by the driver moving back on the seat bar, lifts the points of the teeth clear of the ground, and by the tongues being hinged to the rake, allow the teeth to raise sufficiently high to pass over any obstructions, and thus to pull much lighter and not wear the points of the teeth, as would be the case in the Kenaga device, where the tongues are bolted rigid, or even in the rake that is pulled backward."

Int. 11—" In the specification of the Kenaga patent it is stated, 'that an iron hook, *c*, extended outward from the end of the pole C, will give a hitching-point more directly in front of the horse.' State whether or not such front iron *c* is applied to the rake poles by any one, within your knowledge; and if not, state how the horse is connected with the front end of the pole?

A.—" They are not applied to any of the rakes or poles, to the best of my knowledge, and the horses are attached to the end of the bar, without the use of this iron, by a ring fastened directly to the end of the wooden bar, which is fastened to the horse's breast-strap by means of another strap or chain."

Page 201: C. Int. 21—" In your judgment, cannot a successfully operating rake be made, in accordance with the Kenaga patent, by one skilled in that particular art?

A.—" One serious objection might be raised to the

rakes, as the points of the teeth cannot be gotten off the ground. Aside from this, the rake would work."

C. Int. 22—"This objection, which you have noted, was common to all drag or side-draft rakes, at the date of the Kenaga patent, was it not?

A.—"This was common to all rakes of this class, with the exception of the Hudson rake, who hitched the horses at the side, and provided that a bar might be used, whereby the points of the teeth could be lifted over obstructions or clear of the ground."

Page 211: A. 93—"The *turning of the rake* is not done, nor can it be practicably done, *by the use of the tongues*, as the rake teeth being of such a length, and so many of them, that the friction upon the ground at their points would be so great that it would be very difficult, if at all accomplished, by the ends of these tongues; but as one horse moves forward, and the other one is held back, the horse that is moving forward will turn the rake teeth upon the ground to any desired position, by means of his attachment to the single-tree, as is shown in the Bean and Hudson patents, independent of these tongues."

Page 210: A. 90—"The operation of backing from beneath the load, or away from the stacker, would be the same as in backing the rake at any other time, which would be accomplished, by means of the horses' breast-straps being attached to the forward ends, the same as it would be accomplished by attaching the breast-straps to the forward ends of the bars C, of the Hudson patent."

Page 213: A. 101—"Inasmuch as it is provided so one man can handle the horses, instead of two boys, this much of it would be some advantage, but would not add much, if any, to the capacity, as it could not go back into the field as fast as the old form of drag-rake, as the teeth

would necessarily run into obstructions; and it also requires longer to back from beneath the load a sufficient distance for the horses to turn without cramping the hay, and then turn clear around, which operation would have to be, as far as turning is concerned, repeated, when wishing to gather another load or come back toward the stacker, while with the common drag-rake, the horses are turned straight around and go back into the field without any other stops."

KIRK, page 25, describes his 1882 runner rake as follows: A. 7—"It was a long wooden sweep rake, about twelve feet long, with wooden teeth about eight feet long, mounted on cast-iron runners, and it was operated by hitching a horse at either end, and a boy riding each horse. The rake would be drawn backward in the field to the place of commencing to rake, and the boys would turn the horses and travel in the direction of the stack, gathering the hay on the rake."

Page 35: A. 84—"The poles or tongues, are also guides, each horse being fastened to each tongue. When necessary to turn the rake to the left, hold back the horse on the left by means of the driving line, moving up the horse on the right, keeps both horses' heads in the same direction until the direction is reached in which it is desired to drive the rake and then go ahead."

CRONE, page 82: Int. 39—"State whether or not during the turning movement the horse on the left will be touched by the adjoining pole?

A.—"He would if he did not step to the left, which he is sure to do after an hour or two of practice on the rake."

Page 84: C. Int. 55—"If you had a load on the

rake, do you think either horse could turn it by the breast-strap and pole; by pulling sideways on the strap?

A.—" I don't think it could, a big load."

C. Int. 63—" Is the breaking of poles or rake teeth a very common accident or occurrence?

A.—" They are not infrequent."

CARRINGTON, page 103: C. Int. 38—" Would not a rake drawn backwards into the field be less liable to catch into the ground than when drawn forwards?

A.—" I think it would."

III.

INFRINGEMENT.

BATES, page 166: " If the complainant's patent be constructed to cover any combination of two poles and two draft-bars in a horse-rake, then of course, it would cover defendants' construction; but if it be limited to stiff poles, or *to the particular poles which it shows and describes*, then it clearly does not include the defendants' machine."

DAIN, page 198, f. 367: " The difference in the operation is, that in the Kenaga patent, the tongue being rigid and not allowed a free movement at its forward end, it necessarily rises and falls, with the undulations of the ground, with the points of the rake teeth and not with the horse.

" In the model shown, the tongues, having a free up and down movement, are allowed to move with the horse, independent of the rake teeth; and as the rake teeth drop into a dead furrow or hollow, the tongues do not pull down on the horses' necks, as in the Kenaga device; nor do they strike under his neck, as the teeth pass over an

obstruction; in the Kenaga rake, the teeth continually run on the ground, either in raking or when going back after a load, while in the model shown, by the tongues being hinged, the rake teeth may be raised clear of the ground and not in any way affect the forward ends of the tongues; in the Kenaga device, if the teeth were raised, it would necessarily raise the ends of the tongues up against the horse's neck"

Page 212: A. 99—"In constructing a drag-rake, they have for years been used with a projecting bar outside of the head of the rake, a sufficient distance to allow the horses to be hitched directly back to the bar by a single-tree, and still be outside of the wheel. The wheels very often, however, were placed beneath, or in the body of the rake, and overcomes the objections of having them on the ends of the rake, similar to those shown in defendants' rake. The advantages are, in constructing a rake like defendants' model, over the old form of drag-rakes just mentioned, that in defendants' rake, by means of the hinged tongues, admits of provision being made whereby the rake teeth may be elevated clear of the ground and obstructions, and not in any way affect the position or working of the tongues, and not be allowed to tip too far backward. By this construction of tongue, they will not in any way interfere with the rake teeth passing over rough and uneven ground while raking, nor destroy the free movements of the points of the teeth, which would be the case if a stiff tongue were used, as in passing over obstructions the teeth could not be raised sufficiently high to clear, without raising this stiff tongue up under the horse's neck, at its outward extension or casting at *c*. Then, if the teeth would drop into a dead furrow or hollow, or the horse would be passing over a knoll, the teeth

would be raised clear of the ground, or pull down on the horse's neck."

Stiff Poles.

DAIN, page 199: Int. 8—" Among dealers and manufacturers of agricultural implements, including horse rakes, what would be understood by the expression 'stiff poles secured permanently or removably to the ends of the rake-head,' or what is understood by the term 'stiff poles'?

A.—" They would understand that it was one bar, fastened to the side of the rake-head in such manner that it would not move in any direction, other than that secured in, but could be, if desired, detached from the rake entirely."

Page 211: A. 96—" As the tongues are hinged at their rear ends to the rake in the defendants' model, when the horse is backing, the tongues will conform freely to the height of the horse, and to the height of whatever his attachments may be, and not draw up or down on his neck, as would be the case in the Kenaga or Hudson device."

DAYTON, page 131: C. Int. 11—" Do you understand the word 'stiff,' as there used, to be simply a quality inhering in the material of which the poles are made, or that the stiff was to exist in the relation of the poles to the rake?

A.—" I understand it to apply to the quality of rigidity in the pole itself, the idea of proper rigidity of the connection thereof, with the rake head, not being expressed in words, but assumed and indicated sufficiently in the drawing."

Poles.

BATES, page 180: C. Int. 127—" If poles or shafts, such as are shown in the Currier patent, were attached to

the King rake, in the manner shown in the Currier patent, would it not be necessary to extend said poles or shafts in an upward direction?

A.—" If attached directly to the rake-head, it would be. If attached to the swinging frame, or to the upper cross bar above the axle rake-head, they would not necessarily extend upward."

Page 186: C. Int. 179—" From an examination of the specification and drawing of the Hudson patent, how long would you say the projecting arms to be?

A.—" I should think, altogether, eleven or twelve feet. I base this estimate on the statement of the specification, that the wheels are fifteen feet apart and the prongs eight feet long."

Page 189: R. D. Int. 203—" So far as keeping the horses off the rake is concerned, what advantage, if any, does the rake of the Kenaga patent possess over those of the Hudson and Rumrill patents?

A.—" None whatever."

DAYTON, page 21: A. 6—" The drawing undoubtedly shows the poles bolted or pinned to the rake-head. The words ' secured permanently or removably ' I understand to indicate the allowability of other than this form of attachment, which will commonly, I believe, be understood to be a permanent one, though not so certainly a permanent one as though the poles were framed in with the members of the rake-head."

CRONE, page 81: Int. 30—" You may say whether or not the hitching from the horse's bit to the adjoining pole is an essential in securing the proper operation of the horse?

A.—" It is in almost every instance."

Thills.

BATES, page 189: C. Int. 200—"Would it not be a decided advantage to employ poles, in connection with the thills?

A.—"I think not; I don't see how it would be."

C. Int. 201—"Unless poles were so employed, would there not be danger of the horses breaking the thills, in the operation of backing, or turning, or wheeling the rake?

A.—'No more than there is of breaking the poles, when they are used instead of thills."

DAYTON, page 22: C. Int. 12—"When thills are so employed, do you understand from the patent that the poles C C are to be dispensed with?

A.—"As a backing device, yes."

KIRK, pages 66, 67: "I have experimented and tried to work two horses between thills, one at each end, with the ends of the thills rigidly attached laterally, but vertically pivoted to the draft-bar of the Kenaga rake without the lead poles, and found that the same could not be successfully done, as the horses being confined between the two rigid bars, in moving one horse before the other in turning, the thills would break square off, as the entire leverage of the outside horse would be brought to bear on the pivot horse, and as the shafts or thills serve no leads in guiding the two horses at the same time, my experiment was a failure. With the horses loosely hitched between tugs at the outer end of the draft-bar, and outward and forward at the end of the pole, gives much more room and allows the horses to move sideways a distance of three or four feet without any interference with their sides. The distinction between thills and poles, as commonly understood, is, thills do not extend forward and beyond the front of the horse, neither are horses attached to the ends of

thills by means of breast-straps, while in poles or tongues they are."

Hook *c*.

BATES, page 173: C. Int. 65—" Do you find any statement in the specification or claim of the Kenega patent, that the 'iron hooks *c*' must in all cases be employed?

A.—" No."

C. Int. 66—" Would it, in your judgment, require the exercise of invention upon the part of a skilled mechanic, to omit the iron hooks from the ends of the pole, and employ instead thereof the ordinary means for connecting the breast-strap of a horse to a wagon pole?

A.—" It would not; and that is why I have stated, in a former answer, that the Hudson patent contained the improvements set forth and claimed in the Kenaga patent. The Acme lithograph is a very fair illustration of the Hudson machine, with the horses hitched to the pole in front."

DAIN, page 200: A. 11—" They are not applied to any of the rakes or poles, to the best of my knowledge, and the horses are attached to the end of the bar, without the use of this iron, by a ring fastened directly to the end of the wooden bar, which is fastened to the horse's breast-strap by means of another strap or chain."

Lines.

KIRK, page 34: C. Int. 77—" This advantage is due largely to the arrangement of the lines, as stated in your direct testimony, is it not?

A.—" Well, I would say, in answer to that, that I understand the arrangement of the lines, as used on the Kenaga rake, to be part of the combination to make up

the patent. He certainly could not conveniently manage or back the team without the use of lines."

Page 28: A. 34—" Kenaga had provided tongues or poles, on either end of the rake, for independently attaching each horse by breast-strap of the harness, providing a hitch and arrangement of the lines, whereby one driver could guide and manage the team much easier, both to the team and to the driver, than any rake I had ever seen of like class."

Pages 32, 33: C. Int. 66—" Please give your understanding of the reasons why the Kenaga attachment increased the capacity of those older rakes to such an extent?

A.—" For the reason that the two horses being controlled and driven by one driver, if a tooth of the rake should run into the ground or become otherwise obstructed, the driver simply backs his team to free such tooth and drive forward, which could be done in very much less time than to turn the horses around, traveling a distance of about twenty feet at each turn, taking up the slack rope to move the rake either backwards or forwards. The single-trees often became unhooked from the tugs while turning the horses, causing the drivers to have to dismount and rehook them, all of which took up time."

KIRK, page 62: C. Int. 110—" Do you understand that the method of arranging the lines for driving the horses, is an important feature of the Kenaga patent?

A.—" I think it is an important feature, taken in connection with all the other results to be obtained."

CRONE, page 82: Int. 35—" What if anything then serves to guide the horse, with the hitching-strap omitted?

A.—" The reins."

Int. 36—" Do the reins not serve in such way from the very outset for managing and guiding?

A.—" They do very much."

Int. 37—What if anything do the poles do, *in guiding and wheeling* the team?

A.—" *Nothing at all.*"

Page 84: C. Int. 57—" In fixing the lines, do you so arrange them by splitting them down, or doubling them so that the driver will have two lines for each horse?

A.—" No, sir."

C. Int. 62—" The arrangement of the lines, as given in the directions of the Kenaga patent, would practically give two single lines for each horse, would it not?

A.—" They would be such, to a point in convenient reach of the driver."

PATTON, page 92: Int. 19—" State whether or not, in your experience, the buyer or user of such rake, believed at the outset that such check lines must be employed?

A.—" Some thought it would be necessary to use check reins and some thought it could be managed without."

DAYTON, pages 136-7: C. Int. 36—" What do you understand by the statement in the specification 'having the reins split back to a point in convenient reach'?

A.—" I understand that the reins, running directly from opposite sides of each horse's bit are thus brought into the reach of the driver, standing or riding centrally behind the rake head."

C. Int. 37—" Or, in other words, that the driver has practically a pair of single reins, for each horse?

A.—" Yes."

BATES, page 178: C. Int. 117—" Please state whether, in the Currier patent, there is any statement that the horses are to be attached to the projecting shafts G?

A.—" There is no direct statement to that effect, but that is the obvious intention. In fact, it is a necessity, the machine being a sulky or two-wheeled machine."

Pages 187-8: C. Int. 193—" Do you find, in either of the defendants' patent exhibits, any construction in which the horses are attached at the sides of the rake and are controlled by a single driver?

A.—" In the King, the Middlecoff, the Hudson, and the Bean, the horses are hitched at the side of the rake. It does not appear whether they are controlled by a single driver, but they evidently could be in some of these machines. The Acme lithograph shows how both horses are controlled by a single driver, in a machine like the Hudson. Some of the other patents show constructions, in which the horses are attached at the sides of the machine, so as to be controlled by a single driver, in exactly the same manner as in the Acme Lithograph and in the Kenaga patent; these other machines are corn harvesters, instead of rakes."

Kirk's Additions.

KIRK, page 26: " In the years 1880 and 1881, I also made a few rakes with trucks and tongue, providing means whereby a team of horses could be hitched directly behind the rake, and shove the rake with the load, and guided by means of the trucks and rudders, something on the principle of a header for harvesting grain."

Page 33: C. Int. 71—" Do the teeth in the Kenaga rake, as you make it, have any separate or independent vertical movement or vibration at their points?

A.—" We make such teeth of hickory, eight feet long,

which will spring and conform to the uneven surface of the ground to a very great extent. We also have a lever device for raising the points of such teeth."

PATTON, page 91: Int 8—" What kind of rake, if any, other than this drag-rake of 1882, have you since sold?

A.—" We have sold the rake with the improvements, with tongues, wheels and seat."

Page 94: C. Int. 37—" How do you account for it that the owners all had them changed if they did not know that it could be done on favorable terms?

A.—" By hearing from using the wheel rakes, the advantages over the slide rakes."

Page 92: Int. 12—" The additions of the hitching poles, the wheels instead of the runners, and the seat, when applied to the rake of 1882, made a rake like or unlike the rake shown in the 'Acme Lithograph No. 2?'

A.—" Very much like it."

CORRINGTON, page 101: Int. 14—" What improvement was it which you saw, please explain?

A.—" The wheels and tongue; giving one man the advantage of driving the two horses better than two men to one rake."

Int. 18—" What rake have you used this year?

A.—" The Acme rake, with the attachment for raising the teeth off the ground, or pressing them closer to the ground."

JOHNSON, page 91: C. Int. 25—" Was not the changing from *runners to wheels* an important improvement?

A." —It was."

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Stackers.

DAIN, page 214, concerning getting hay to stackers or rickers, says:

A. 106—"There was considerable difficulty when the boys first started to work the rake, until they had learned how to handle the horses; so, also, there would be with one person handling both horses; but in either case these objections would soon be overcome, especially in the case where the tongues were used."

Page 215: A. 115—"These stackers are used with all forms of rake, including complainant's common drag-rakes, and rakes that the farmers themselves build."

DAYTON, page 150: A. 108—"The Kenaga improvement has a value by reason of its use with a stacker, but it also has a value independently of the stacker, for the rake may obviously be employed alone, provided any farmer has such use for it."

Model of Appellees' Machine.

DAIN, page 199: A. 7—"In the model shown, the staples are made so they could be drawn up against the upper bar; but in the rakes as manufactured they are not made so they can be drawn up; neither would it work properly if drawn up, as it would throw the ends of the tongues too high for attachment to the horse's breast-strap; neither would we have the advantage of the raising of the points of the teeth, as the tongues would hold them down. The purpose of the staples, is to hold the rake from tipping over backwards, after it has been raised a sufficient distance to clear the teeth of the ground or obstructions, and enable it to be balanced entirely on two wheels."

From this review of the law, of the evidence, and of the prior art, it will be seen that there was no error committed in dismissing appellant's bill for want of equity.

L. L. BOND,
For Appellees.